WORK ORDER NO. 1876546

A/E CONTRACT NO.
N40085-21-D-0091

APPROPRIATION: ___

FY26 Special Project, RM21-0262
Repair MCIS/MARDET Student Housing Building 550

At the

NAS Oceana, Dam Neck, Virginia

SUBMITTED BY:

AECOM Services, LLC.
222 Central Park Avenue, Suite 300
Virginia Beach, VA 23462

PREPARED BY:

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Telecommunications: Brian Waller
Cybersecurity: Eric Dunn
Electronic Security Systems: Jeff Tonero
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Lead Architect or Engineer: Christine Carlson, RA
A/E Firm Name: AECOM
Date: April 28, 2026

James E. Donahue, R.A.

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SECTION 01 14 00

WORK RESTRICTIONS
11/22, CHG 5: 05/25

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)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements

1.2 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

List of Contact Personnel

SD-07 Certificates

1.3 SPECIAL SCHEDULING REQUIREMENTS

a. Have materials, equipment, and personnel required to perform the work at the site prior to the commencement of the work.

b. The adjacent parking lot and building 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.

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

1.4 CONTRACTOR ACCESS AND USE OF PREMISES

1.4.1 Activity Regulations

Ensure that Contractor personnel employed on the Activity become familiar with and obey Activity regulations including safety, fire, traffic and security regulations. Keep within the limits of the work and avenues of ingress and egress. Wear appropriate personal protective equipment (PPE) in designated areas. Do not enter any restricted areas unless required to do so and until cleared for such entry. Ensure all Contractor equipment, including delivery vehicles, are clearly identified with their company name.

1.4.1.1 Subcontractors and Personnel Contacts

Provide 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.

1.4.1.2 Installation Access

Obtain access to Navy installations through participation in the Defense Biometrics Identification System (DBIDS). Requirements for Contractor employee registration, and transition for employees currently under Navy Commercial Access Control System (NCACS), are available at https://www.cnic.navy.mil/Operations-and-Management/Base-Support/DBIDS/. No fees are associated with obtaining a DBIDS credential.

Participation in the DBIDS is not mandatory, and Contractor personnel may apply for One-Day Passes at the Base Visitor Control Office to access an installation.

1.4.1.2.1 Registration for DBIDS

Registration for DBIDS is available at https://www.cnic.navy.mil/Operations-and-Management/Base-Support/DBIDS/. Procedure includes:

a. Present a letter or official award document (i.e. DD Form 1155 or SF 1442) from the Contracting Officer, that provides the purpose for access, to the base Visitor Control Center representative.

b. Present valid identification, such as a passport or Real ID Act-compliant state driver's license.

c. Provide completed SECNAV FORM 5512/1 to the base Visitor Control Center representative to obtain a background check. This form is available for download at https://www.cnic.navy.mil/Operations-and-Management/Base-Support/DBIDS/.

d. Upon successful completion of the background check, the Government will complete the DBIDS enrollment process, which includes Contractor employee photo, fingerprints, base restriction and several other assessments.

e. Upon successful completion of the enrollment process, the Contractor employee will be issued a DBIDS credential, and will be allowed to proceed to worksite.

1.4.1.2.2 DBIDS Eligibility Requirements

Throughout the length of the contract, the Contractor employee must continue to meet background screen standards. Periodic background screenings are conducted to verify continued DBIDS participation and installation access privileges. DBIDS access privileges will be immediately suspended or revoked if at any time a Contractor employee becomes ineligible.

An adjudication process may be initiated when a background screen failure results in disqualification from participation in the DBIDS, and Contractor employee does not agree with the reason for disqualification.

The Government is the final authority.

1.4.1.2.3 DBIDS Notification Requirements

a. Immediately report instances of lost or stolen badges to the Contracting Officer.

b. Immediately collect DBIDS credentials and notify the Contracting Officer in writing under the following circumstances:

(1) An employee has departed the company without having properly returned or surrendered their DBIDS credentials.

(2) There is a reasonable basis to conclude that an employee, or former employee, might pose a risk, compromise, or threat to the safety or security of the Installation or anyone therein.

1.4.1.2.4 One-Day Passes

Personnel applying for One-Day passes at the Base Visitor Control Office are subject to daily mandatory vehicle inspection, and will have limited access to the installation. The Government is not responsible for any cost or lost time associated with obtaining daily passes or added vehicle inspections incurred by non-participants in the DBIDS.

1.4.1.3 No Smoking Policy

Smoking is prohibited within and outside of all buildings on installation, except in designated smoking areas. This applies to existing buildings, buildings under construction and buildings under renovation. Discarding tobacco materials other than into designated tobacco receptacles is considered littering and is subject to fines. The Contracting Officer will identify designated smoking areas.

1.4.2 Working Hours

Regular working hours will consist of an 8 1/2 hour period , between 7 a.m. and 3:30 p.m., Monday through Friday, excluding Government holidays.

1.4.3 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 for inspecting the work in progress, giving the specific dates, hours, location, type of work to be performed, contract number and project title. Based on the justification provided, the Contracting Officer may approve work outside regular hours. During periods of darkness, the different parts of the work must be lighted in accordance with requirements of EM 385-1-1.

1.4.4 Existing Buildings

Work will be around existing buildings which are occupied. Do not enter the buildings without prior approval of the Contracting Officer.

The Government will remove and relocate other Government property in the areas of the buildings scheduled to receive work.

1.4.5 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 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 and fire alarm are considered utility cutovers pursuant to the paragraph WORK OUTSIDE REGULAR HOURS.

d. Operation of Station Utilities: Do 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. Notify the Contracting Officer giving reasonable advance notice when such operation is required.

e. Connection to Existing Sanitary Sewer Line: Provide positive verification that the existing line conveys sanitary sewer; verify line is not incorrectly connected to a storm drain. Obtain Installation's Sanitary Sewer Connection Permit 2 weeks prior to connection and in accordance with G30 Site Civil/Mechanical Utilities.

1.5 SECURITY REQUIREMENTS

Contract Clause FAR 52.204-2 Security Requirements and Alternate II and the following apply:

Dual citizenship is not permitted.

1.5.1 Naval Air Station, Oceana, Virginia Beach, VA

Contractor personnel are required to obtain personnel identification badges. In accordance with Section 01 30 00 ADMINISTRATIVE REQUIREMENTS, paragraph SUBCONTRACTORS AND PERSONNEL, submit, in triplicate, a list of his subcontractors and the work each is to perform. On this listing must appear the names of the key personnel of the Contractor and subcontractors. A copy of the list of key personnel will be forwarded to the Naval Air Station, Oceana, Security Department by the Contracting Officer. The key personnel are responsible for identifying other Contractor and subcontractor personnel for the purpose of obtaining identification badges. Contractors working in restricted work areas are also required to obtain special identification badges for personnel requiring access to the restricted work areas. Immediately after award, submit a letter to the Contracting Officer with the following information for each employee: Company name, employee's name, Social Security number, height, and weight. Also, indicate the names of persons authorized to vouch for additional employees requiring badges.

1.5.2 Fleet Trng Cntr Atlantic (FTCLANT), Dam Neck, Virginia Beach, VA

a. Required Company Information. Furnish the FTCLANT Base Security Officer (Code 14) with the following information on company letterhead:

(1) Contract number and duration of contract.

(2) List of make, model, and license number of company vehicles requiring decals.

(3) Copy of insurance policy covering company vehicles, indicating the Virginia State minimum insurance requirements have been met.

(4) List of employees who will require ID cards with normal work hours.

(5) Name and sample signature of the representative responsible for obtaining and returning ID cards.

The preceding information must be received by the Commanding Officer, Fleet Training Center Atlantic, Dam Neck, Virginia Beach, VA 23461-5000, Attn: Base Security Officer (Code N31, Bldg. 543); or brought to the Base Security Office located in Building 448, prior to the first day of work.

b. Required Information on Privately Owned Vehicles. Advise company employees who desire to use their privately owned vehicles to personally bring the vehicle, vehicle registration, copy of vehicle insurance policy, valid State inspection documentation, and driver's license to the pass and decal office located at the main gate.

c. Current Information. Contractors are responsible for keeping the vehicle and employee lists current, and for securing and returning identification cards belonging to terminated employees to the command security manager's office.

d. Valid ID Cards. Contractor ID cards must be valid for each entry aboard FTCLANT from 6 a.m. to 6 p.m., Monday through Friday only, unless prior arrangements have been made with the Resident Officer in Charge of Construction, Naval Air Station Oceana, and the Base Police Officer, FTCLANT, has been notified.

e. Providing Information to Subcontractors. Prime Contractors are responsible for ensuring that subcontractors receive security information. Failure to comply with specified requirements will result in prime Contractors and subcontractors being denied access to construction sites.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES
11/20, CHG 5: 02/25

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	(2021) Engineering and Design -- Construction Equipment Ownership and Operating Expense Schedule

1.2 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Earned Value Report; G

1.3 EARNED VALUE REPORT

1.3.1 Data Required

This Contract requires the use of a cost-loaded Network Analysis Schedule (NAS). Schedule of Prices must not be used with cost-loaded Network Analysis Schedule (NAS). Use Earned Value Report derived from cost-loaded NAS. Within 15 calendar days of notice of award, prepare and deliver to the Contracting Officer an Earned Value Report (construction Contract) as directed by the Contracting Officer. Provide a detailed breakdown of the Contract price, giving quantities for each of the various kinds of work, unit prices, and extended prices. Indirect activities (e.g., meetings, presentations, submittals, surveys, haul road or storage yard maintenance, dust control, security) will not be cost loaded. Evenly distribute the costs across the associated construction activities. Contractor overhead and profit including salaries for field office personnel, if applicable, must be proportionately spread over all pay items and not included as individual pay items.

1.3.2 Payment Schedule Instructions

Payments will not be made until the Earned Value Report from the cost-loaded NAS has been submitted to and accepted by the Contracting Officer. For design phase progress payment(s), the Schedule of Prices or Earned Value Report from the Cost Loaded CPM must include detailed design activities and general (summarized) approach for the construction phase(s) of the project. The Earned Value Report must be fully developed with

detailed construction line items as design progresses. The complete design and construction Earned Value Report must be submitted and accepted prior to starting construction work.

For Fast-Tracked or Critical Path Submittals of construction projects, the Earned Value Report must include detailed design and construction line items for each fast-tracked/ critical path phase(s), submitted to and accepted by the Contracting Officer during the Post Award Kickoff Meetings and confirmed prior to starting construction work in that phase. Additionally, the Earned Value Report must be separated as follows:

a. Primary Facilities Cost Breakdown:

Defined as work on the primary facilities out to the 5 foot line. Work out to the 5 foot line includes construction encompassed within a theoretical line 5 foot from the face of exterior walls and includes attendant construction, such as pad mounted HVAC cooling equipment, cooling towers, and transformers placed beyond the 5 foot line.

b. Supporting Facilities Cost Breakdown:

Defined as site work, including incidental work, outside the 5 foot line.

1.3.3 Schedule Requirements for HVAC TAB

The field work requirements in D30 HVAC must be broken down in the Earned Value Report from the cost-loaded NAS by separate line items which reflect measurable deliverables. The value for each pay item listed below will be established on a case by case basis for each Contract. The line items are as follows:

a. Approval of Design Review Report: The TABS Agency is required to conduct a review of the project plans and specifications to identify any feature, or the lack thereof, that would preclude successful testing and balancing of the project HVAC systems. Submit the resulting findings to the Government to allow correction of the design. The progress payment will not be issued until the report is reviewed and approved.

b. Approval of the pre-field engineering report: The TABS Agency submits a report which outlines the scope of field work. The report must contain details of what systems will be tested, procedures to be used, sample report forms for reporting test results and a quality control checklist of work items that must be completed before TABS field work commences.

c. Season I field work: Incremental payments are issued as the TABS field work progresses. The TABS Agency mobilizes to the project site and executes the field work as outlined in the pre-field engineering report. The HVAC water and air systems are balanced and operational data must be collected for one seasonal condition (either summer or winter depending on project timing).

d. Approval of Season I report: On completion of the Season I field work, the data is compiled into a report and submitted to the Government. The report is reviewed, and approved, after ensuring compliance with the pre-field engineering report scope of work.

e. Completion of Season I field QA check: Contract QC and Government representatives meet the TABS Agency at the jobsite to retest portions of the systems reported in the Season I report. The purpose of these tests are to validate the accuracy and completeness of the previously submitted Season I report.

f. Approval of Season II report: The TABS Agency completes all Season II field work, which is normally comprised mainly of taking heat transfer temperature readings, in the season opposite of that under which Season I performance data was compiled. Compile this data into a report and submit to the Government. On completion of submittal review to ensure compliance with the pre-field engineering report scope, progress payment is issued. Progress payment is less than that issued for the Season I report since most of the water and air balancing work effort is completed under Season I.

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, base equipment use rates 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 for Construction Contracts and FAR 52.232-5 Payments Under Fixed-Price Construction Contracts. Invoices not completed in accordance with contract requirements will be returned to the Contractor for correction of the deficiencies. Include the documents listed below in the requests for payment.

a. The Contractor's invoice, on NAVFAC Form 7300/30 furnished by the Government, showing in summary form, the basis for arriving at the amount of the invoice. Form 7300/30 must include certification by Quality Control (QC) Manager as required by the Contract.

b. The Estimate for Voucher/ Contract Performance Statement on NAVFAC Form 4330/54 furnished by the Government. Use NAVFAC Form 4330, unless otherwise directed by the Contracting Officer, on NAVFAC Contracts when a Monthly Estimate for Voucher is required. Earned Value Report from the cost-loaded NAS.

c. Contractor's Monthly Estimate for Voucher and Contractors Certification (NAVFAC Form 4330) with Subcontractor and supplier payment certification. Other documents, including but not limited to, that need to be received prior to processing payment include the following submittals as required. These items are still required monthly even when a pay voucher is not submitted.

d. Monthly Work-hour report.

e. Updated Construction Progress Schedule and tabular reports required by the contract.

f. Contractor Safety Self Evaluation Checklist.

g. Updated submittal register.

h. Solid Waste Disposal Report.

i. Certified payrolls.

j. Updated testing logs.

k. Other supporting documents as requested.

1.5.2 Submission of Invoices

If DFARS Clause 252.232-7006 Wide Area WorkFlow Payment Instructions is included in the Contract, provide the documents listed in above paragraph CONTENT OF INVOICE in their entirety as attachments in Wide Area Work Flow (WAWF) for each invoice submitted. The maximum size of each WAWF attachment is two megabytes, but there are no limits on the number of attachments. If a document cannot be attached in WAWF due to system or size restriction, provide it as instructed by the Contracting Officer.

Monthly invoices and supporting forms for work performed through the anniversary award date of the Contract must be submitted to the Contracting Officer within 5 calendar days of the date of invoice. For example, if Contract award date is the 7th of the month, the date of each monthly invoice must be the 7th and the invoice must be submitted by the 12th of the month.

1.5.3 Final Invoice

a. A final invoice must be accompanied by the certification required by DFARS 252.247.7023 Transportation of Supplies by Sea, and the Contractor's Final Release. If the Contractor is incorporated, the Final Release must contain the corporate seal. An officer of the corporation must sign and the corporate secretary must certify the Final Release.

b. For final invoices being submitted via WAWF, the original Contractor's Final Release Form and required certification of Transportation of Supplies by Sea must be provided directly to the respective Contracting Officer prior to submission of the final invoice. Once receipt of the original Final Release Form and required certification of Transportation of Supplies by Sea has been confirmed by the Contracting Officer, the Contractor must then submit final invoice and attach a copy of the Final Release Form and required certification of Transportation of Supplies by Sea in WAWF.

c. Final invoices not accompanied by the Contractor's Final Release and required certification of Transportation of Supplies by Sea will be considered incomplete and will be returned to the Contractor.

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.

1.6.1 Obligation of Government Payments

The obligation of the Government to make payments required under the provisions of this Contract will, at the discretion of the Contracting Officer, be subject to reductions and suspensions permitted under the FAR and agency regulations including the following in accordance with FAR 32.103 Progress Payments Under Construction Contracts:

a. Reasonable deductions due to defects in material or workmanship;

b. Claims which the Government may have against the Contractor under or in connection with this Contract;

c. Unless otherwise adjusted, repayment to the Government upon demand for overpayments made to the Contractor; and

d. Failure to maintain accurate "as-built" or record drawings in accordance with FAR 52.236.21 and the contract.

e. Failure to submit accurate monthly schedule updates in accordance with the contract.

1.6.2 Payment for Onsite and Offsite Materials

Progress payments may be made to the Contractor for materials delivered on the site, for materials stored off construction sites, or materials that are in transit to the construction sites under the following conditions:

a. FAR 52.232-5(b) Payments Under Fixed Price Construction Contracts.

b. Materials delivered on the site, but not installed, and off-site materials to be considered for progress payment must be major high cost, long lead, special order, or specialty items, not susceptible to deterioration or physical damage in storage or in transit to the construction site. Examples of materials acceptable for payment consideration include, but are not limited to, structural steel, non-magnetic steel, non-magnetic aggregate, equipment, machinery, large pipe and fittings, precast/prestressed concrete products, plastic lumber (e.g., fender piles/curbs), and high-voltage electrical cable. Materials not acceptable for payment include consumable materials such as nails, fasteners, conduits, gypsum board, glass, insulation, and wall coverings.

c. Provide the Contracting Officer with documentation (e.g., Purchase Orders or Material Contracts) to justify payment for materials in advance of installation. When appropriate, include the Defense Priorities and Allocations System (DFAS) ratings (e.g., DX or DO) on purchase orders or material contracts to ensure timely delivery.

d. Materials to be considered for progress payment prior to installation must be specifically and separately identified in the Contractor's estimates of work submitted for the Contracting Officer's approval in accordance with Earned Value Report requirement of this Contract. Requests for progress payment consideration for such items must be supported by documents establishing their value (e.g., paid invoices) and that the title requirements of the clause at FAR 52.232-5 Payments Under Fixed-Price Construction Contracts have been met.

e. Ensure materials are adequately insured and protected from theft and

exposure. Provide insurance documentation (e.g., Builder's Risk Insurance) which covers the overall value of the materials to be paid in advance of installation.

f. Provide a written consent from the surety company with each payment request for offsite materials.

g. Materials to be considered for progress payments prior to installation must be stored either in Hawaii, Guam, Puerto Rico, or the Continental United States. Other locations are subject to written approval by the Contracting Officer.

h. Materials in transit to the job site or storage site are not acceptable for payment.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS
11/20, CHG 5: 02/25

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)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements

1.2 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

View Location Map; G

Progress and Completion Pictures; G

Design Submittal Packaging; G

Performance Assessment Plan (PAP); G

1.3 VIEW LOCATION MAP

Submit, prior to or with the first digital photograph submittals, a sketch or drawing indicating the required photographic locations. Update as required if the locations are moved.

1.4 PROGRESS AND COMPLETION PICTURES

Photographically document site conditions prior to start of construction operations. Include aerial photographs. Provide monthly, and within one month of the completion of work, digital photographs, 1600x1200x24 bit true color minimum resolution in JPEG file format showing the sequence and progress of work. Take a minimum of 20 digital photographs each week throughout the entire project from a minimum of ten different viewpoints selected by the Contractor unless otherwise directed by the Contracting Officer. Submit with the monthly invoice one set of digital photographs in the agency construction management system of record, cumulative of all photos to date. Indicate photographs demonstrating environmental procedures. Provide photographs for each month in a separate monthly directory and name each file to indicate its location on the view location sketch. Also provide the view location sketch with the submission in the agency construction management system of record as a digital file.

Include a date designator in file names. Photographs provided are for unrestricted use by the Government.

1.5 MINIMUM INSURANCE REQUIREMENTS

Provide the minimum insurance coverage required by FAR 28.307-2 Liability, during the entire period of performance under this contract. Provide other insurance coverage as required by Virginia law.

1.6 SUPERVISION

1.6.1 Superintendent Qualifications

Provide project superintendent with a minimum of 10 years experience in construction with at least 5 of those years as a superintendent on projects similar in size and complexity. The individual must be familiar with the requirements of EM 385-1-1 and have experience in the areas of hazard identification and safety compliance. The individual must be capable of interpreting a critical path schedule and construction drawings. The qualification requirements for the alternate superintendent are the same as for the project superintendent. The Contracting Officer may request proof of the superintendent's qualifications at any point in the project if the performance of the superintendent is in question.

1.6.2 Minimum Communication Requirements

Have at least one qualified superintendent, or competent alternate, capable of reading, writing, and conversing fluently in the English language, on the job-site at all times during the performance of Contract work. In addition, if a Quality Control (QC) representative is required on the Contract, then that individual must also have fluent English communication skills.

1.6.3 Duties

The project superintendent is primarily responsible for managing subcontractors and coordinating day-to-day production and schedule adherence on the project. The superintendent is required to attend Red Zone meetings, partnering meetings, and quality control meetings. The superintendent or qualified alternative must be on-site at all times during the performance of this contract until the work is completed and accepted.

1.6.4 Non-Compliance Actions

The Project Superintendent is subject to removal by the Contracting Officer for non-compliance with requirements specified in the contract and for failure to manage the project to ensure timely completion. Furthermore, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders is acceptable as the subject of claim for extension of time or excess costs or damages by the Contractor.

1.7 PRECONSTRUCTION MEETING

Upon completion of design and design acceptance by the government, prior to commencing any work at the site, coordinate with the Contracting Officer a time and place to meet for the Preconstruction Meeting. The

purpose of this meeting is to discuss and develop a mutual understanding of the administrative requirements of the Contract including but not limited to: daily reporting, invoicing, value engineering, safety, base-access, outage requests, hot work permits, schedule requirements, quality control, earned value report, shop drawings, submittals, cybersecurity, prosecution of the work, government acceptance, final inspections and contract close-out. Contractor must present and discuss their basic approach to scheduling the construction work and any required phasing.

1.7.1 Attendees

Contractor attendees must include the Project Manager, Superintendent, Site Safety and Health Officer (SSHO), Quality Control Manager and major subcontractors.

1.8 POST AWARD KICKOFF (PAK) MEETING

Immediately after award, coordinate with the Contracting Officer a time and place for the PAK Meeting. The PAK meeting must be held within 35 calendar days after contract award and prior to commencing work. If mutually agreed upon by the Contractor and the Government, the PAK Meeting may be held concurrently with the Design Presentation/Design Development Meeting or Concept Design Workshop (CDW) whichever is required.

1.8.1 PAK Meeting Outcomes

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 and the User's functional requirements. Confirm the design is within the project budget.

c. Review the administrative requirements of the contract that are critical during the design phase.

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

e. Obtain an acceptable conceptual design including floor and site plans, signed by the client, Contractor and other key team members.

f. Review the project design schedule and design package requirement, design submittal packaging, and preliminary construction schedule in accordance with Section 01 32 17.00 20 COST-LOADED NETWORK ANALYSIS SCHEDULE (NAS). Discuss design milestones and events that will be included in the Quality Control Communication Plan.

g. Establish clear expectations and schedules for facility turnover, providing DD Form 1354 asset management records, eOMSI submittals, Guiding Principle Validation, Third Party Certification (if applicable), and training of Government maintenance personnel.

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

i. Establish clear expectations for Design Model presentations for projects implementing Building Information Management/Modeling (BIM).

1.8.2 PAK Meeting Contractor Attendees

The following Contractor personnel must attend the PAK meeting; Project Manager, Project Scheduler, Lead Designer-of-Record (DOR), Design Staff responsible for each architectural/engineering discipline when facility design is discussed, Superintendent, QC Manager, DQC Manager and the Commissioning Authority (CA). Optional attendees include: Principal, Assistant Project Manager, major subcontractors and specialized supplemental QC personnel.

1.9 DESIGN PRESENTATION/DEVELOPMENT (DP/D)

The Contractor must lead discussions to develop an understanding of the facility design that the accepted technical proposal represents with the Government users and maintainers of the facility. Develop site plans, floor plans, exterior finish materials, and building elevations to conduct working sessions with the Government meeting attendees. The purpose of the DP/D Meeting is to confirm the appropriateness of the facility design and develop acceptable alternatives if changes are needed. The Contractor must anticipate that Government Facility Users represented at the DP/D Meeting will provide additional functional information. Incorporate functional design changes into the facility design as required to meet the needs of the Users. At the end of the DP/D Meeting the Contractor must provide either assurance that the updated design can be built within the budget or identify potential cost modification items and establish a follow-on DP/D Meeting to finalize a design that will include trade-offs to bring the project within the budget. The following Contractor key personnel must attend the Design Presentation: Project Manager, Project Scheduler, Cost Estimator, Lead Designer of Record, Design Staff responsible for each architectural/engineering discipline when facility design is discussed, Major Subcontractors, and DQC.

Demonstrate ability to achieve identified Guiding Principle sustainability goals and also Third-Party Certification sustainability goals, if applicable. Provide Preliminary Sustainability Notebook, refer to Section 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING for requirements.

1.10 FACILITY TURNOVER PLANNING MEETINGS (Red Zone Meetings)

Meet with the Government to identify strategies to ensure the project is carried to expeditious closure and turnover to the Client. Start planning the turnover process at the Pre-Construction Conference meeting with a discussion of the Red Zone process and convene at regularly scheduled Red Zone Meetings beginning at approximately 75 percent of project completion. Include the following in the facility Turnover effort:

1.10.1 Red Zone Checklist

a. Contracting Officer's Technical Representative (COTR) will provide the Contractor a copy of the Red Zone Checklist template.

b. Prior to 75 percent completion, modify the Red Zone Checklist template by adding or deleting critical activities applicable to the project and assign planned completion dates for each activity. Submit the modified Red Zone Checklist to the Contracting Officer. The Contracting Officer may request additional activities be added to the Red Zone Checklist at any time as necessary.

1.10.2 Meetings

a. Conduct regular Red Zone Meetings beginning at approximately 75 percent project completion, or three to six months prior to Beneficial Occupancy Date (BOD), whichever comes first.

b. The Contracting Officer will establish the frequency of the meetings, which is expected to increase as the project completion draws nearer. At the beginning, Red Zone meetings may be every two weeks then increase to weekly towards the final month of the project.

c. Using the Red Zone Checklist as a Plan of Action and Milestones (POAM) and basis for discussion, review upcoming critical activities and strategies to ensure work is completed on time.

d. During the Red Zone Meetings discuss with the COTR any upcoming activities that require Government involvement.

e. Maintain the Red Zone Checklist by documenting the actual completion dates as work is completed and update the Red Zone Checklist with revised planned completion dates as necessary to match progress. Distribute copies of the current Red Zone Checklist to attendees at each Red Zone Meeting.

1.11 PARTNERING

Host the partnering session within 45 calendar days of contract award. To most effectively accomplish this Contract, the Contractor and Government must form a cohesive partnership with the common goal of drawing on the strength of each organization in an effort to achieve a successful project without safety mishaps, conforming to the Contract, within budget and on schedule. The partnering team must consist of personnel from both the Government and Contractor including project level and corporate level leadership positions. Key Personnel from the supported command, end user, NAVFAC, PWD, FEAD/ROICC, Contractor, key subcontractors and the Designer of Record (DOR) (regardless of whether the contract is a design-build or a design-bid-build) are required to participate in the Partnering process.

1.11.1 Team-Led (Informal) Partnering

a. The Contracting Officer will coordinate the initial Team-Led (Informal) Partnering Session with key personnel of the project team, including Contractor and Government personnel. The Partnering Session will be co-led by the Government Construction Manager and Contractor's Project Manager.

b. The Initial Team-led Partnering session may be held concurrently with the Pre-Construction Post-Award Kickoff meeting. Partnering sessions will be held at a location mutually agreed to by the Contracting Officer and the Contractor, typically at a conference room on-base or at the Contractor's temporary trailer.

c. The Initial Team-Led Partnering Session will be conducted and facilitated using electronic media (a video and accompanying forms) provided by Contracting Officer.

d. The Partners will determine the frequency of the follow-on sessions.

e. Participants will bear their own costs for meals, lodging and

transportation associated with Partnering.

1.12 PERFORMANCE ASSESSMENT PLAN (PAP)

The Performance Assessment Plan (PAP) will 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 Contractor Performance Appraisal Reporting System (CPARS) 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 or on the Whole Building Design Guide at: https://www.wbdg.org/dod/ufgs/ufgs-01-30-00. 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 projects meetings which discuss project performance. Submit an updated PAP on a monthly basis with the invoice for that period as a minimum.

1.13 MOBILIZATION

Mobilize to the jobsite within 30 calendar days of final site or building design approval. Mobilize is defined as having equipment AND having a physical presence of at least one person from the contractor's team on the jobsite.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 31 23.13 20

ELECTRONIC CONSTRUCTION AND FACILITY SUPPORT CONTRACT MANAGEMENT SYSTEM (eCMS)

08/23, CHG 1: 02/24

PART 1 GENERAL

1.1 CONTRACT ADMINISTRATION

Utilize the Naval Facilities Engineering Systems Command's (NAVFAC's) Electronic Construction and Facility Support Contract Management System (eCMS) for the transfer, sharing, and management of electronic technical submittals and documents. The web-based eCMS is the designated means of transferring technical documents between the Contractor and the Government. Paper media or email submission, including originals or copies, of the documents are not permitted unless identified within the contract.

All government contracting specialist/officer, legal, and command communications will remain the same.

1.2 USER PRIVILEGES

The Contractor's key staff may be provided access to eCMS. Contact the COR for eCMS account access. Project roles and system roles will be established to control each user's menu, application, and software privileges, including the ability to create, edit, or delete objects. Additional project roles may be assigned for workflow. The COR makes the final decision on roles for the project. User's ability to view, edit documents may be lowered at the discretion of the COR.

Only one eCMS user account is required regardless of the number of user's projects. Notify the COR within seven calendar days if a contractor user is no longer associated with company or project so they can remove them from any open record and inactivate them from the project.

1.2.1 eCMS Subcontractor Users

If the contractor's user is a subcontractor, the subcontractor must be registered under the name of their company and email. For example it is common for contractors to contract Quality Control Managers. The QC Manager's account should be under their company's name and email reducing the number of eCMS accounts required.

For Design Build, the contractor's Designer of Record Architectural Engineer will be given a single account. Only one account per AE is required. The role of the AE is determined by the project role assigned by the COR. The contractor is to request their AE staff be placed into the AE-KTR-DOR project role.

1.2.2 Users with Multiple Roles

Users may have multiple roles associated with their account within eCMS. Roles are used in workflow. When a user is added to the project, they will be assigned the default role when the user was created. Contact the COR to change or add roles to the user for the project.

1.2.3 Loss of Privilege

Users may lose privilege to access eCMS at the discretion of the Contracting Officer. The eCMS is a collaborative system that allows flexibility of use and does not restrict all inappropriate user actions. User activities are logged into eCMS in visible and background data collection. Users found to use eCMS in an inappropriate action may have their eCMS access revoked. Examples include, but not limited to, fraudulent representations, sharing user accounts with others, and changing approved records without the consent of the COR. Depending on the severity of the infraction, the users can lose eCMS access for a period of time, permanently for the project, or lose eCMS access for any project. The contractor may appeal the suspension in writing to the contracting officer within 14 calendar days of notice. The appeal must identify the infraction, supporting information, and steps to ensure the infraction will not happen in the future.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

List of Contractor's Personnel; G

For Division 1 government approved Pre-Construction submittals, combine into a single Pre-Construction Submittal Package. Annotated with SD Type of SD-01. Pre-Construction submittal package approval date will be used as a KPI.

1.4 SYSTEM REQUIREMENTS AND CONNECTIVITY

1.4.1 General

NAVFAC eCMS requires a web-browser (platform-neutral) and Internet connection. For best results, recommend using browser in InPrivate/Incognito mode; Internet speeds greater than 40mbps when uploading files, computers with high RAM and Solid State Drives, "White List" eCMS website, Zip or Split files for better uploading. Non-NAVFAC Users are not to use VPN when using eCMS per NAVFAC IT.

The use of eCMS is required by the Contractor and all associated costs and time necessary to utilize eCMS will be borne by the Contractor with no allowance for time extensions and at no additional cost to the government.

1.4.2 Contractor Personnel List

Within 20 calendar days of contract award, provide to the Contracting Officer a list of Contractor's personnel who will have the responsibility for the transfer, sharing and management of electronic design, submittals, RFIs, daily reports, and other files and will require access to the eCMS. Project personnel roles which must be filled as applicable in the eCMS, include, at a minimum, the Contractor's Project Manager (KTR-PM), Designer of Record (AE-KTR-DOR), Superintendent (KTSUPT), Quality Control (QC) Manager (KTR-QC), Principal (KTR-PRIN), and Site Safety and Health Officer

(KTR-SSHO). Notify the COR immediately of any personnel changes to the project. The Contracting Officer reserves the right to perform a security check on all potential users.

Internal design deliberations under a D-B contract are managed outside of eCMS. Besides the D-B DOR Representative, D-B design team members are neither required nor encouraged to create user accounts in eCMS. Users are highly recommended to take eCMS live or online training prior to use. See https://www.navfac.navy.mil/Business-Lines/Design-and-Construction/About-Us/Design-and-Construction-Documents/Electronic-Construction-Management-System-eCMS/ for eCMS useful information

Provide the following information:

Company Name

Name (First, Last)

Email Address

Project Role (CQM, SSHO, Superintendent, CM, PM, Principal)

Existing or New eCMS User

1.5 SECURITY CLASSIFICATION

In accordance with Department of Navy guidance, all military construction contract data are unclassified, unless specified otherwise by a properly designated Original Classification Authority (OCA) and in accordance with an established Security Classification Guide (SCG). Refer to the project's OCA when questions arise about the proper classification of information.

In conformance with the Freedom of Information Act (FOIA), DoD INSTRUCTION 5200.48 CONTROLLED UNCLASSIFIED INFORMATION (CUI), and DoD requirements, any unclassified project documentation uploaded into the eCMS must be designated either "U - UNCLASSIFIED" (U) or "CUI - CONTROLLED UNCLASSIFIED INFORMATION" (CUI).NAVFAC eCMS must only be used for the transaction of unclassified information associated with construction projects. Controlled Unclassified Identification (CUI) documents may be loaded into eCMS with the appropriate markings.

1.5.1 Markings on CUI Documents

Contractor's proprietary information, or documents determined by the originator in accordance with CUI guidance, should be marked CUI. Proprietary information not marked CUI can be released under the Freedom of Information Act (FOIA). Apply the appropriate markings before any document is uploaded into eCMS. Markings are not required on Unclassified U documents.

1.6 eCMS UTILIZATION

Establish, maintain, and update data and documentation in the eCMS throughout the duration of the contract. Utilize eCMS to transfer all submittals, RFIs, daily reports, and other files required by contract to be forwarded to the government.

Full eCMS use is required. All Submittals/Information to use eCMS Modules

including, but not limited to, RFIs, Daily Reports, Meeting Minutes, Communications, Issues, Punch Lists, Checklists, and Flysheets, unless otherwise directed by the COR or Contracting Officer.

1.6.1 Restricted Information

Personally Identifiable Information (PII) transmittal such as credit card, driver's license, passport, social security, and payroll number are not permitted in eCMS. Name, address, and email are permitted. Pre-negotiation information such as cost estimates that require formal negotiations are not allowed. For example, proposed changes over the SAP level of $250k require formal negotiations. Cost estimates for LEAN, ULTRA LEAN, and Design Changes under the SAP level are at the discretion of the COR's or Contract Specialist/Officer's direction. The eCMS must only be used for the transaction of unclassified information associated with construction projects. Controlled Unclassified Identification (CUI) documents may be loaded into eCMS with the appropriate markings. Uploading of files directly into the Documents folder is not allowed. All documents must be uploaded using an eCMS module.

1.6.2 Naming Convention for Files

Titles of files uploaded are to be descriptive of the purpose and content of the file. For example RFI_ROOF_Leak.doc or for submittals, SUB_LIGHT_FIXTURE.pdf. Titles of file to be uploaded must only contain uppercase letters, lowercase letters, numbers, hyphens (-), underscores (_) and periods (.). Use of any other characters is not allowed and may create an error. When practicable, adding the record number to the title is desired. For example RFI_XYZ12345_ROOF_Leak.doc. Uploading files with the same title will create a new revision in eCMS. Original revision is Rev 0, the first revision is Rev 1. Uploaded files are to use the default file location regardless of the module used unless directed by the COR.

Table 1 also identifies which eCMS application is to be used in the transmittal of data (these are subject to change based on the latest software configuration).

Table 1 - Project Documentation Types

SUBJECT/NAME	REMARKS	eCMS APPLICATION
As-Built Drawings	Locations of sensitive areas must be labeled as either "Controlled Area" or "Restricted Area" and may be shown on unclassified documents with the approval from Site Security Manager	Submittals
Building Information Modeling (BIM)	Locations of sensitive areas must be labeled as either "Controlled Area" or "Restricted Area" and may be shown on unclassified documents with the approval from Site Security Manager	Submittals

SUBJECT/NAME	REMARKS	eCMS APPLICATION
Construction Permits	Refer to rules of the issuing activity, state or jurisdiction	Submittals
Construction Schedules (Activities and Milestones)		Submittals
Construction Schedules		Submittals
Construction Schedules (3-Week Look ahead)	Import the schedule file into the scheduling application, and select "Approve" to establish a new schedule baseline	Meeting Minutes
DD 1354 Transfer of Real Property	When applicable, required for final billing.	Submittals
Daily Production Reports	Provide weather conditions, crew size, man-hours, equipment, and materials information	Daily Report
Daily Quality Control (QC) Reports	Provide QC Phase, Definable Features of Work Identify visitors	Daily Report
Designs and Specifications	Locations of sensitive areas must be labeled as either "Controlled Area" or "Restricted Area" and may be shown on unclassified documents with the approval from Site Security Manager	Submittals
Environmental Notice of Violation (NOV), Corrective Action Plan	Refer to rules of the issuing activity, state or jurisdiction	Submittals
Environmental Protection Plan (EPP)		Submittals
Invoice (Supporting Documentation)	Applies to supporting documentation only. Invoices are submitted in Wide-Area Workflow (WAWF)	Submittals
Jobsite Documentation, Bulletin Board, Labor Laws, SDS	Redact any PII information when loaded into eCMS	Submittals

SUBJECT/NAME	REMARKS	eCMS APPLICATION
Meeting Minutes		Meeting Minutes
Modification Documents	Provide final modification documents for the project. Upload into Modifications RFPs folder	Communications
Operations & Maintenance Support Information (OMSI/eOMSI), Facility Data Worksheet	1. Locations of sensitive areas must be labeled as either "Controlled Area" or "Restricted Area" and may be shown on unclassified documents with the approval from Site Security Manager 2. Design reviews will be performed in existing "Dr Checks"	Submittals
Photographs	Subject to base/installation restrictions	Submittals
QCM Initial Phase Checklists		Meeting Minutes or Checklists
QCM Preparatory Phase Checklists		Meeting Minutes or Checklists
Quality Control Plans		Submittals
QC Certifications		Submittals
QC Punch List		Punch Lists
Red-Zone Checklist		Punch List or Checklists
Rework Items List		Punch Lists
Request for Information (RFI) Post-Award		RFIs
Safety Plan		Submittals
Safety - Activity Hazard Analyses (AHA)		Submittals
Safety - Mishap Reports		Daily Report

SUBJECT/NAME	REMARKS	eCMS APPLICATION
Shop Drawings	Locations of sensitive areas must be labeled as either "Controlled Area" or "Restricted Area" and may be shown on unclassified documents with the approval from Site Security Manager	Submittals
Storm Water Pollution Prevention (Notice of Intent - Notice of Termination)	Refer to rules of the issuing activity, state or jurisdiction	Submittals
Submittals and Submittal Register		Submittals
Testing Plans, Logs, and Reports		Submittals
Training/Reference Materials		Submittals
Training Records (Personnel)	Redact any PII information if storing in eCMS	Submittals
Utility Outage/Tie-In Request/Approval		Submittals
Warranties/BOD Letter		Submittals
Quality Assurance Reports		Checklists (Government initiated)
Non-Compliance Notices		Non-Compliance Notices (Government initiated)
Other Government-prepared documents		GOV ONLY
Letters to government contracting, claims, REAs, and other contracting officer communications	eCMS is not the primary tool to use in contracting officer communications. eCMS can only store documents or letters after the submission to the contracting officer is made.	Communications

SUBJECT/NAME	REMARKS	eCMS APPLICATION
All Othere Documents	Refer to FOIA guidelines and contact the FOIA official to determine whether exemptions exist	As applicable

1.6.3 RFIs Module

Create contractor RFIs using eCMS RFIs module. The contractor must confirm the numbering convention with the COR if different than eCMS default.

If the government (GOV) Response has "No" Cost or Schedule Impact, this reply is given with the expressed understanding that it does not constitute a basis for any change in the amount or time of subject contract. Information provided in this response does not authorize work not currently included in the contract. If GOV Response is "Yes" or "Potentially" then this response may require a change to the contract. If the contractor disagrees with either the government's No Cost determination or No Schedule impact determination, or both, the contractor has 14 calendar days to notify the COR and Contracting Officer in writing.

1.6.4 Submittals Module

Create contractor submittals using eCMS Submittals module. The contractor must confirm the numbering convention with the COR if different than eCMS default.

1.6.5 Submittal Packages Module

Create submittal packages using the eCMS Submittal Packages module in lieu of or in addition to Related Objects. Submittal Packages track completion of the packaged submittals and is used in NAVFAC HQ's KPIs.

1.6.6 Communications Module

Create communications using the eCMS Communications module. The Communications module is used to create or document communications that are not a part of other eCMS modules. Use of Communications module will memorialize information into an eCMS record file. The following are Types of Communications:

Email

Memo to File

Face to Face

Telephone

Web Collaboration

Photos

Other Documents

Other

Unless directed by the COR, upload documents or files that do not have a corresponding eCMS module. Choose "Photos" Type for Photos and "Other Documents" for all other documents.

1.6.7 Issues Module

Create or respond to issues using the eCMS Issues module. Respond to CPARS issues using the Issues module.

1.6.8 Meeting Minutes Module

Create or respond to Meeting Minutes using the eCMS Meetings module.

Document required contractual meetings. Dates of meetings are used in NAVFAC KPIs. Minimum meetings in eCMS include the following:

Post Award Kickoff (PAK)

Pre-construction (Pre Con)

Initial and Preparatory Three Phases of Control

Quality Control (QC)

1.6.9 Potential Change Items Module

Not used.

1.6.10 Daily Report Module

Create Daily Reports using the eCMS Daily Report Module. The contractor must confirm the numbering convention with the COR if different than eCMS default.

1.6.11 Punchlists Testing Logs (Legacy)

Punchlist Testing Logs is a legacy program that is being replaced by the Punch Lists Module. This module is to be used for reference of past projects. Use the Punch Lists Module for all future work.

1.6.12 Punch Lists Module

The eCMS Punch Lists module is useful more than just for Punchlists. The module includes the capability of batch editing, create items from Optical Character Recognition (OCR) plans, assign tasks and track completion of individual items.

Create the following using the Punch Lists module:

Rework Items List

DFOW List

Punch-Out Inspection

Pre-Final Punchlist Inspection

Final Punchlist Inspection

Testing Logs

1.6.13 FWD UltraLean COAR RFP Module

Not used.

1.6.14 Non-Compliance Notices (NCN) Module

Respond to Non-Compliance Notices listed in the Non-Compliance Notices module.

1.6.15 Checklists

Use Checklist listed in the contractor's eCMS menu and as directed by the COR. Checklists capture data and is used in dashboards and KPIs.

1.6.15.1 Partnering Team Health Survey Checklist

Contractor must use the eCMS checklist to document the partnering team health survey. Partnering Team Health Survey is in accordance with the Partnering Specification of this contract.

1.6.16 Flysheets

Use Flysheets listed in the contractor's eCMS menu, if available, and as directed by the COR. Flysheets allow the contractor to print out information from other systems and upload into eCMS. The eCMS will use OCR to capture the information as data. Flysheets capture data and used in dashboards and KPIs.

1.6.17 eCMS Outage

In the case where eCMS is unavailable for 8 hours or more, paper or email may be used in the interim to maintain project schedule.

Once the system is operational, all final records are required to be recreated using the appropriate module. Subject/title of the record to include the type of record i.e., RFI/Submittal/Daily Report/Communication/Other, the identification number(s), and the statement "Processed Outside of eCMS". Example, "RFI 001 Processed Outside of eCMS".

1.6.18 User Account Activity

NAVFAC eCMS captures user data and activities that are directly related to the user's account. The user agrees through the use of eCMS, their account activities will be captured and can be displayed on eCMS printed reports.

1.7 QUALITY ASSURANCE

Requested Government response dates on Submittals must be in accordance with the terms and conditions of the Contract unless previously agreed by the COR. Requesting response dates earlier than the required review and response time, without concurrence by the Government COR, may be cause for rejection.

Incomplete submittals will be rejected without further review and must be

resubmitted. Required Government response dates for resubmittals must reflect the date of resubmittal, not the original submittal date.

All submittals and associated attachments must be transmitted to the Government via the COR. Transmittals are no longer required when using eCMS since approval status is tracked on the submittal. Transmittal forms can be attached to submittals if approved by the COR. Submittals requiring government approval are "Transmitted For" "Approval". Submittals requiring contractor approved submittals, including those designated for Contractor Quality Control approval or Information Only, are "*Transmitted For" "Information Only" in the Submittal Module. Provide and sign the QC certification or approving statement on the attachment per submittal specification section. When Submittal Packages are required, use eCMS Submittal Packages after creating individual submittals. Importing Submittals from the Submittal Register is optional. Contact the COR for the data conversion requirements.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 32 17.00 20

COST-LOADED NETWORK ANALYSIS SCHEDULES (NAS)
05/25

PART 1 GENERAL

1.1 DEFINITIONS

The cost-loaded Network Analysis Schedule (NAS) is a tool to manage the project, both for Contractor and Government activities. The NAS is also used to report progress, evaluate time extensions, and provide the basis for progress payments.

For consistency, when scheduling software terminology is used in this section, the terms in Oracle Primavera's scheduling programs are used.

1.2 NAS REQUIREMENTS PRIOR TO THE START OF WORK

1.2.1 Preliminary Scheduling Meeting

Before preparation of the Baseline NAS, and prior to the start of work, meet with the Contracting Officer to discuss the proposed NAS and the requirements of this section. Propose projected data dates for monthly update NAS for the project and incorporate each monthly update submittal into the submittal register. Discuss required forms, terminology, and submittal requirements of this section and other requirements related to schedule management for this contract. Use the NAVFAC-provided Preliminary Scheduling Meeting Guideline in the completion of the intended mutual understanding.

1.2.2 Baseline NAS

1.2.2.1 Baseline NAS

Submit the Baseline NAS at the Post-Award Kickoff (PAK) Meeting or within 30 calendar days after contract award whichever occurs first. The Baseline NAS must include detailed design activities and a general approach to construction, including summary activities for required phasing and definable areas. Summary Construction activities must not exceed duration of 60 calendar days, unless approved otherwise by Contracting Officer. Data date must be set to contract award date and no progress recorded for any activity.

Only bonds and the required Preliminary Scheduling Meeting may be recorded as complete prior to acceptance of the Baseline NAS. The acceptance of a Baseline NAS is a condition precedent to:

a. The Contractor submitting the first design submittal.

b. Processing Contractor's invoices(s)other than that for the bonds.

1.2.2.2 Post-Award Kickoff (PAK) Meeting and Baseline NAS

Present the Baseline NAS at the PAK Meeting. Be prepared to discuss the NAS logic emphasizing how the NAS satisfies the design package requirements and incorporates the required government review periods for each design submittal.

1.2.2.3 Construction Baseline NAS

Submit the detailed Construction Baseline NAS prior to the pre-final design submittal. The pre-final design submittal will not be reviewed until a Construction Baseline NAS is submitted.

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

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

b. Processing Contractor's invoices for demolition or construction activities.

c. Review of any construction phase NAS updates.

Submittal of the Construction Baseline NAS must be the Contractor's certification that the submitted NAS meets the requirements of the Contract Documents, and represents the Contractor's plan on how the work will be accomplished. Provide all items listed in paragraph REQUIRED TABULAR REPORTS AND NATIVE P6 XER FILES with baseline NAS submittal.

1.3 WEEKLY LOOK AHEAD SCHEDULE

1.3.1 Quality Control and Production Integration with NAS

Submit the first Look Ahead Schedule 30 days after contract award and continue to submit weekly until contract completion.

Transmit the Weekly Look Ahead Schedule Submittal to the Contracting Officer on the first day of the current week that the Look Ahead Schedule covers and at least one working day prior to any Quality Control meetings. Contractor is required to provide all attendees at meetings with a copy of the Look Ahead Schedule. A Look Ahead Schedule is required to be submitted weekly regardless of whether a meeting is held or not.

1.3.2 Weekly Look Ahead Schedule Requirements

Prepare and issue a Three-Week Look Ahead Schedule to provide a more detailed day-to-day plan of upcoming work identified on the current Network Analysis Schedule. Requirements include:

a. For each Look Ahead Schedule activity, identify parent NAS activity number(s). The parent NAS activity is the activity in the NAS that would incorporate the Look Ahead Schedule activity requirement and scope of work.

b. Update schedule each week to show the planned work for the following three-week period. Also include previous week, as-built work, showing actual start and finish dates.

c. Include upcoming outages, closures, preparatory meetings, and initial meetings, testing and inspections.

d. Identify any offsite fabrication and production activities.

e. Clearly identify Longest Path activities on the Weekly Look Ahead

Schedule. Include a key or legend that distinguishes longest path activities. Include all Longest Path activity NAS start/finish dates exceeded and occurring during this period.

f. Identify responsibility for each activity.

g. The detail work plans are to be bar chart type schedules, derived from but maintained separately from the Project NAS on an electronic spreadsheet program and printed on 11 by 17 inch sheets as directed by the Contracting Officer.

h. Activities must not exceed 5 working days in duration and have sufficient level of detail to assign crews, tools and equipment required to complete the work.

i. For design-build: Identify any design production and quality control activities, meetings, and charrettes.

j. Look Ahead activities are not limited to only onsite work. Include submittal, offsite fabrication, and procurement activities. Include design activities, meetings, and coordination when part of scope.

k. Upload the Weekly Look Ahead Schedules to eCMS as a submittal by the date and time required.

1.4 MONTHLY NETWORK ANALYSIS

Submittal of Monthly NAS is the Contractor's certification that the submitted NAS meets the requirements of the Contract Documents and represents the Contractor's plan on how the work will be accomplished. Provide all items listed in paragraph REQUIRED TABULAR REPORTS AND NATIVE P6 XER FILES with the monthly NAS submittal.

1.4.1 Monthly Update Meeting

Meet with Government representative(s) at monthly intervals to review and agree on the information presented in the Monthly NAS Update. The Monthly Update Meeting must be a separate and distinct meeting from other meetings required of the contract. As a minimum, accomplish the following with each meeting held monthly:

a. Prior to the meeting, provide an agenda of proposed topics to be discussed to include but not limited to narrative report and items listed in paragraph REQUIRED TABULAR REPORTS. Document agenda and minutes with Meeting Minutes object in eCMS for each monthly update meeting.

b. The Approved Designated Project Scheduler must present the NAS data using Oracle Primavera P6 software and have baseline NAS, monthly update NAS, and Time Impact Analysis native files available to review as necessary.

c. Review Time Impact Analysis.

d. Document action items in eCMS Meeting Minutes for necessary revisions to Monthly NAS Update and to address any delays and or problem areas in a timely manner.

1.4.2 Monthly NAS Updates

a. The submission of an accepted, updated NAS to the Government is a condition precedent to the processing of the Contractor's invoice.

b. Regardless of whether an invoice is being submitted monthly, or no project progress occurred, an updated NAS (or with new data date) must be submitted monthly to the Government. The Monthly NAS update must be submitted within 5 calendar days of the data date.

c. Regardless of whether a baseline or other NAS is submitted and accepted, an updated NAS must be submitted monthly to the Government. Monthly updates submitted before the baseline being accepted may be returned as received for record.

d. Provide all items listed in paragraph REQUIRED TABULAR REPORTS AND NATIVE P6 XER FILES, with each monthly NAS update submittal.

e. Activity progress must incorporate as-built events as they occurred and correspond to records including but not limited to submittals and daily production and quality control reports.

f. Software Settings: Handle NAS calculations through Retained Logic, not Progress Override. Out of Sequence progress is not allowed. Relationships must be changed to reflect as-built relationships. Show all activity durations and float values in days. Show activity progress using Remaining Duration. Set default activity type to "Task Dependent".

g. Updated NAS must reflect current Contract Completion Date and contract value in accordance with all conformed contract modifications issued prior to data date of NAS update.

1.4.3 As-Built NAS

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

1.5 CORRESPONDENCE AND TEST REPORTS

Reference NAS Activity IDs that are being addressed in each correspondence (e.g., letters, Submittals, Requests for Information (RFIs), e-mails, meeting minute items, Production and QC Daily Reports, material delivery tickets, photographs) and test report (e.g., concrete, soil compaction, weld, pressure).

1.6 ADDITIONAL NETWORK ANALYSIS SCHEDULE REQUIREMENTS

Other specification sections may include additional NAS related requirements, including systems to be inspected, tested and commissioned, and submittal procedures. Those requirements must be incorporated into the NAS.

1.7 SUBMITTALS

Government approval/acceptance is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are

for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Baseline NAS; G

Construction Baseline NAS; G

Designated Project Scheduler; G

SD-07 Certificates

Weekly Look Ahead Schedule

Monthly NAS Updates; G

SD-11 Closeout Submittals

As-Built NAS; G

1.8 SOFTWARE

Prepare and maintain project NAS using Oracle Primavera P6 software in a version compatible with Government's current version. Submit XER files exported as version 17 or earlier. Importing data into P6 using data conversion techniques or third party software is cause for rejection of the submitted NAS. NAS with Performing Organizational Breakdown Structure (POBS) data in any form other than column is cause for rejection. NAS must be scheduled by using the Schedule command after last entry in Oracle Primavera P6 prior to export for submission to the Government.

1.9 DESIGNATED PROJECT SCHEDULER

Within 30 calendar days of contract award, submit to the Contracting Officer for approval an individual who will serve as the Designated Project Scheduler. Include a copy of the candidate's resume with qualifications. The Designated Project Scheduler is subject to removal by the Contracting Officer for non-compliance with the requirements specified in the Contract. Payment request will not be processed without an approved Designated Project Scheduler.

1.9.1 Qualifications

The Designated Project Scheduler must have served as a scheduler and prepared and maintained at least three previous NAS for projects, at least one within the last 5 years of similar size and complexity to this contract, using Oracle Primavera P6.

1.9.2 Duties

Duties of the Designated Project Scheduler include to be actively involved and be responsible for the following:

a. Prepare Baseline NAS.

b. Prepare monthly NAS updates.

c. Prepare tabular reports.

d. Prepare Time Impact Analysis (TIA) as necessary.

e. Provide certification of contract compliance for each NAS and TIA submittal transmitted to government for review.

f. Participate with the Prime Contractor and Government Representative in a monthly teleconference call, and scheduled with sufficient time to support the Monthly Network Analysis Updates process, to discuss project status, NAS updates, critical activities, potential delays, and contract modifications impacting any project progress. Have a computer with P6 software available during the meeting.

1.10 NETWORK SYSTEM FORMAT

Prepare the NAS in accordance with the following Primavera P6 settings and parameters. Deviation from these settings and parameters, without prior consent of the Contracting Officer, is cause for rejection of NAS submittal.

1.10.1 NAS Activity Properties and Level of Detail

1.10.1.1 Activity Identification and Organization

a. Identify design and construction activities planned for the project and other activities that could impact project completion if delayed in the NAS.

b. Each activity must have a unique name.

c. Identify administrative type activity/milestones, including all pre-construction submittal and permit requirements prior to demolition or construction stage.

d. Include durations for procurement, Contractor quality control, acceptance testing and training in the NAS.

e. Include the Government approval time required for the submittals that require Government Approval prior to construction, as indicated in Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES.

f. Create separate activities for each Phase, Area, Floor Level and Location the activity is occurring.

g. Do not use activities to represent non-work type reference (e.g., Serial Letter, Request for Information) in NAS. When RFIs need to be included in NAS, identify Non-work reference with use of added Activity codes (e.g, RFI code, Serial Letter Code). Document use of added activity codes in narrative report.

Activity categories included in the NAS are specified below.

1.10.1.2 Activity Logic

a. With the exception of the Contract Award and Contract Completion Date (CCD) milestone activities, activity must not be open-ended; each activity must have at least one predecessor and at least one successor.

b. Activities must not have open start or open finish (dangling) logic.

c. Do not use lead or lag logic without Contracting Officer prior approval. Request for approval must be submitted at the required Preliminary Scheduling Meeting for use in the Baseline NAS and at the required Monthly Network Analysis Update Meeting for use in a monthly updated NAS.

d. Minimize redundant logic ties.

e. Once an activity exists on the NAS it must not be deleted or renamed to change the scope of the activity and must not be removed from the NAS logic without approval from the Contracting Officer. Request for approval must be submitted with the required Monthly NAS Update Narrative.

f. While an activity cannot be deleted, where said activity is no longer applicable to the NAS, but must remain within the logic stream for historical record, change the activity original and remaining duration to zero and clearly label "(NO LONGER REQUIRED)" after the Activity Name.

(1) Document any such change in the activities' "Notebook," including a date and explanation for the change.

(2) The ID number for a "NO LONGER REQUIRED" activity must not be re-used for another activity.

g. No activity can be added to the NAS without the prior approval from the Contracting Officer. Request for approval must be submitted at the required Monthly Network Analysis Update Narrative for use in a monthly updated NAS.

h. Activity Type for all activities except for milestones must be set to "Task Dependent". "Level of Effort" Activity Type is not allowed.

i. Duration Type for all activities except for milestones must be set to "Fixed Duration & Units".

j. Percent Complete Type for all activities including milestones must be set to "Physical".

1.10.1.3 Longest Path Activity Baseline Limitation

For P6 settings, critical activities are defined as being on the Longest Path. Longest Path (Critical) Activities must not make up more than 30 percent of all activity within the Construction Baseline NAS.

1.10.1.4 Assigned Calendars

All NAS activity must be assigned calendars that reflect required and anticipated non-work days.

Total work hours/day for all defined calendars is set to 8.

1.10.1.5 Activity Categories

1.10.1.5.1 Design Activities

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

1.10.1.5.2 Pre-construction Activities

Examples of pre-construction activities include, but are not limited to, bond approval, permits, pre-construction submittals and approvals. Include pre-construction activities that are required to be completed prior to the Contractor starting the demolition or construction stage of work.

1.10.1.5.3 Procurement Activities

Include activities necessary to manage the ordering, fabrication, and delivery of material and equipment. Procurement activities must not have a duration in excess of 60 calendar days without prior approval by the Contracting Officer. Include within sequence of off-site assembly and fabrication any quality control and testing being performed.

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 must 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. Show each delivery with relationship tie to the Construction Activity specifically for the delivery.

1.10.1.5.4 Government Activities

Government and other agency activities that could impact progress must 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.

1.10.1.5.5 Construction Quality Management (CQM) Activities

The Preparatory and Initial Phase meetings for each Definable Feature of Work identified in the Contractor's Quality Control Plan must be included in the Weekly Look Ahead Schedules. Preparatory and Initial phase meetings are not required in the NAS, but can be represented by a start milestone linked to successor parent Construction Activity. The Follow-up Phase must be represented by the Construction Activities themselves in the NAS.

1.10.1.5.6 Construction Activities

On-site construction activities that are the responsibility of the

Contractor or Contractor's subcontractors must not have a duration in excess of 20 working days without prior approval by the Contracting Officer. Contractor activities must be driven by calendars that reflect Saturdays, Sundays and all Federal Holidays as non-work days, unless otherwise defined in this contract. Federal Holidays are as defined in Federal Law 5 USC 6103.

1.10.1.5.7 Turnover and Closeout Activities

Include activities or milestones for items on the NAVFAC Red Zone Checklist/POAM that are applicable to this project. As a minimum, include required Contractor testing, required Government acceptance inspections on equipment, Pre-Final Inspection, Punch List Completion, Final Inspection and Acceptance. Add an unconstrained start milestone for the initial NAVFAC Red Zone - Facility Turnover Planning Meeting at approximately 75 percent construction contract completion or six months prior to Contract Completion Date (CCD), whichever is sooner. Include a separate NAVFAC Red Zone - Facility Turnover Planning Meeting Milestone for each phase if the contract requires construction to be completed in phases.

1.10.1.5.8 Testing of HVAC - DALT, TAB, and PVT Activities

Include in the baseline NAS, activities and milestones associated with Government acceptance of Duct Air Leakage Test (DALT), Testing, Adjusting, and Balancing (TAB) and Performance Verification Test (PVT) as required and in accordance with Specification D30 HVAC.

a. Identify the general area or location(s) for Government Acceptance Testing of DALT, TAB and PVT.

b. Incorporate into the baseline NAS, time periods required for advance notification of work, and Government submittal review in accordance with Specification D30 HVAC.

c. Include the following as NAS activities or milestones:

(1) Pre-DALT/TAB/PVT Meeting

(2) TAB Design Review Report, Government review

(3) TAB Pre-Field Engineering Report, Government review

(4) DALT Field Work

(5) DALT Field Acceptance Testing

(6) Certified Final DALT Report, Government review

(7) Control Contractors PVT Plan, Government review

(8) Equipment Suppliers PVT Plan, Government review

(9) Endurance Testing, Government review

(10) PVT Field Work

(11) PVT Report, Government review

d. Include in the baseline schedule, the following cost-loaded

activities. These activities will be successors to the Substantial Completion Milestone and predecessors to the Project Completion Milestone as defined in paragraph PROJECT COMPLETION MILESTONE.

(1) Season I TAB Field Work

(2) Season I Certified Final TAB Report, Government review

(3) Season I TAB Field Acceptance Testing

(4) Season II TAB Field Work

(5) Season II Certified Final TAB Report, Government review

(6) Season II TAB Field Acceptance Testing

(7) Post-Occupancy Endurance Testing Government review

(8) Post-Occupancy PVT Field Work

1.10.1.5.9 Commissioning Activities

Include in the baseline NAS activities and milestones associated with Commissioning.

a. Identify the general area or location(s) of systems for Commissioning Inspection and Testing

b. Incorporate into the baseline NAS time periods for Government submittal review

1.10.1.6 Contract Milestones and Constraints

1.10.1.6.1 Project Start Date Milestones

Include as the first activity on the NAS a start milestone titled, "Contract Award", which must have a Mandatory Start constraint equal to the Contract Award Date.

1.10.1.6.1.1 Design Phase Completion Milestone

Include an unconstrained finish milestone on the NAS titled, "Design Phase Completion". Design Phase Completion is defined as the point in time when all design requirements are complete and approved. Duration for Government review and approval must be included as predecessor activities to Design Phase Completion.

1.10.1.6.1.2 Post-Award Kickoff (PAK) meeting Milestone

Include an unconstrained finish milestone on the NAS titled, "Post-Award Kickoff Meeting". The Post Award Kickoff Meeting may be a single day, or it may range over several days. The intent is to cover all PAK topics, including Partnering and Concept Design Workshop (if required) in one continuous session.

1.10.1.6.2 Preconstruction Submittals Finish Milestone

Include an unconstrained finish milestone on the NAS titled, "Preconstruction Submittals". This milestone is complete when all

required preconstruction submittals have been reviewed and approved by the Government.

1.10.1.6.3 Contractor Mobilization Finish Milestone

Include an unconstrained finish milestone on the NAS titled, "Contractor Mobilization".

1.10.1.6.4 NAVFAC Red Zone - Facility Turnover Planning Meeting Milestones

See paragraph TURNOVER AND CLOSEOUT ACTIVITIES above.

1.10.1.6.5 Substantial Completion Milestone

Include an unconstrained finish milestone on the NAS titled "Substantial Completion." Substantial Completion is defined as the point in time the Government would consider the project ready for beneficial occupancy wherein by mutual agreement of the Government and Contractor, Government use of the facility is allowed while construction access continues in order to complete remaining items (e.g., punch list and other close out submittals). Include a separate Substantial Completion Milestone for each phase if the contract requires construction to be completed in phases.

1.10.1.6.6 DD-1354 Finish Milestone

Add unconstrained finish milestone, titled "DD-1354" and scheduled 30 calendar days prior to Substantial Completion, whenever a Form DD-1354 is required in accordance with Section 01 20 00 PRICE AND PAYMENT PROCEDURES. Include a separate DD-1354 Finish Milestone for each phase if the contract requires construction to be completed in phases.

1.10.1.6.7 Project Completion Milestone

Include an unconstrained finish milestone on the NAS titled "Project Completion." Project Completion is defined as the point in time all contract requirements are complete and verified by the Government with a successful Final Inspection in accordance with Section 01 45 00 QUALITY CONTROL. This milestone must have the Contract Completion Date (CCD) milestone as its only successor.

1.10.1.6.8 Contract Completion Date (CCD) Milestone

Last NAS entry must be an unconstrained finish milestone titled "Contract Completion (CCD: DD-MM-YY)." DD-MM-YYYY is the current contract completion date at data date, day-month-year corresponding to P6 Must Finish By Date. NAS milestone updates of Project Completion finish date for longest path must reflect calculated float as positive or negative based on CCD. Calculation of NAS updates must be such that if the finish of the "Project Completion" milestone falls after the contract completion date, then negative float is calculated on the longest path. If the finish of the "Project Completion" milestone falls before the contract completion date, the float calculation must reflect positive float on the longest path.

1.10.1.6.9 Additional Milestones

Provide up to five additional milestones as required by Contracting Officer.

1.10.1.7 Work Breakdown Structure & Activity Code

At a minimum, establish a Work Breakdown Structure (WBS) and provide activity codes identified as follows:

1.10.1.7.1 Work Breakdown Structure (WBS)

Group all activities and milestones within appropriate WBS elements/levels including, at a minimum, the following:

a. Project Milestones:

(1) Management Milestones

(2) Project Administrative Meetings

(3) Permits

(4) Design Phase

(5) Design Submittals and Reviews Milestones

b. Pre-Construction Phase:

(1) Submittals and Reviews

(2) Procurement

(3) Mobilization

c. Construction Phase: Create multiple elements/levels in accordance with project specific definable features of work including in WBS descending order as follows:

(1) General Area

(a) Type of Work Item

1. Location

d. Project Closeout: Include activity items such as, but not limited to, Punchlist, Demobilization, O&M, As-built Drawings, Training, and As-built NAS.

e. Modifications: Create Conformed and Non-Conformed elements/levels under Modification WBS. Create multiple elements/levels as the project progresses identified by issue and Fragnet placed in Conformed for modifications issued prior data date, or Non-Conformed for issues not modified to contract prior data date.

f. Removed Activity: Activity is "removed" by remaining within logic sequence, eliminating duration and adding "(NO LONGER REQUIRED)" after Activity Name in Activity Table.

g. Commissioning & Testing:

(1) Specific area/locations of commissioning

(2) Final Testing

(3) Training

1.10.1.7.2 Responsibility Code

Use "RESP" for Activity Code Name. All activities in the project NAS must be identified with the resource, including business name, for completing the task. Activities must not belong to more than one responsible party.

1.10.1.7.3 Activity Category Code

Use "CAT" for Activity Code Name for the following Project Level activity codes:

a. Assign "PROC" value to Procurement type activity

b. Assign "PRE-CON" value to Pre-construction activity

c. Assign "CONS" value to Construction type activity

d. Assign "TEST" value to dedicated testing type activities

e. Assign "CX" value to dedicated Commissioning type activities

f. Assign "CLOS" value to dedicated Close Out type activity

g. Assign "OTHR" to other activity not otherwise designated

h. Assign "DSGN" value to Design type activity

1.10.1.7.4 Additional Activity Codes

Provide up to an additional five activity codes as required by the Contracting Officer

1.10.1.7.5 Construction Specification Institute (CSI) Masterformat Code

Identify all activities in the project NAS with its respective Specification Section number. Activities must not belong to more than one Section number. If an activity does not have an applicable CSI Code (e.g., Mobilize), the code must be "0000".

1.10.1.8 Adverse Weather Lost Work Days

Use the National Oceanic and Atmospheric Administration's (NOAA) Summary of Monthly Normals report to obtain the historical average number of days each month with precipitation, using a nominal 30-year, greater than 0.10 inch precipitation amount parameter, as indicated on the Station Report 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, in addition to 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 only 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 are on the longest path to contract completion in the period when delay occurred. 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. Impacts resulting from adverse weather must be documented in Narrative Report for the month that it occurred.

Make changes to P6 project calendars to reflect as-built conditions where work occurred where originally anticipated as non-work days, and where work did not occur (lost work day).

1.10.1.9 Cost Loading

The Project Network Analysis Schedule (NAS) must be cost-loaded and will provide the basis for progress payments. Earned Value Reports must be derived from and correspond to cost loaded NAS. Use the Critical Path Method (CPM) and the Precedence Diagram Method (PDM) to satisfy time and cost applications.

Sum of all costs assigned to activities must equal the current contract value as of the data date of the baseline or update NAS. Activity cost loading must be without front-end loading. Provide additional documentation if requested by the Contracting Officer.

1.10.1.9.1 Cost Loading Activities

a. Cost load construction activities. Define construction activities as on-site work activities that can be traced directly to the construction, alteration, demolition, repair of a project facility, infrastructure, or sitework.

b. Assign costs for materials which payment will be requested in advance of installation, including their quantities, to their respective procurement activities that were approved by the Contracting Officer. Assign labor costs, including their quantities, for material and equipment paid for after installation to their respective construction activities.

c. Costs for mobilization will not be paid as individual pay items with the exception of batch plant set-up, mobilization of dredging equipment or other similar labor-intensive situations. If payment for mobilization costs are approved, assign costs for demobilization activities. The value of demobilization activities must not be less than 40 percent of the total costs for mobilization activities. If not approved as a separate line item, evenly disperse over construction activities the costs for mobilization and demobilization.

d. The value of commissioning, testing, and closeout WBS section may not be less than 10 percent of the total costs for procurement and construction activities.

e. ALL activities assigned Government responsibility will have Zero Cost. No contractor cost should be assigned to an activity designated as a Government responsibility.

f. Do not include field overhead positions as individual cost loaded activities. Evenly disperse non-construction costs (e.g., meetings, presentations, submittals, surveys, haul road or storage yard maintenance, dust control, security) and profit to construction

activities assigned to the Construction Phase WBS level.

g. If assigning resources to activities, setting for Calculate costs from units in Resources tab must be unchecked.

1.10.1.9.2 Partial Payment

Breakdown unit of measure and cost must be defined within P6 Activity Detail Expenses for partial payment of any cost loaded activity. Lump sum cost loaded activity will not be partially paid.

1.10.2 NAS Software Settings and Restrictions

a. Activity Constraints: Date/time constraint(s), other than those required by the contract, are not 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 as described in paragraph REQUIRED TABULAR REPORTS.

b. Default Progress Data Disallowed: Actual Start is date work begins on activity with intent to pursue work to substantial completion. Actual Finish is date work is substantially complete to point where successor activity can begin. Actual dates on the NAS must correspond with activity dates reported on the Contractor Quality Control and Production Reports.

c. At a minimum, include the following settings and parameters in P6 NAS preparation:

(1) General: Define or establish Calendars and Activity Codes at the "Project" level, not the "Global" level.

(2) Admin Drop-Down Menu, Admin Preferences, Time Periods Tab:

(a) Set time periods for P6 to 8.0 Hours/Day, 40.0 Hours/Week, 172.0 Hours/Month and 2000.0 Hours/Year.

(b) Use assigned calendar to specify the number of work hours for each time period: Must be checked.

(3) Admin Drop-Down Menu, Admin Preferences, Earned Value Tab:

(a) Technique for computing performance percent complete: Use "Activity percent Complete"

(b) Technique for computing Estimate to Complete: Use "PF = 1".

(c) Earned Value Calculation: Use "Budgeted values with current dates".

(4) Project Level, Dates Tab:

(a) Set "Must Finish By" date to "Contract Completion Date", and set "Must Finish By" time to 05:00pm.

(5) Project Level, Defaults Tab:

(a) Duration Type: Set to "Fixed Duration & Units".

(b) Percent Complete Type: Set to "Physical".

(c) Activity Type: Set to "Task Dependent".

(d) Calendar: Set to "Standard 5 Day Workweek". Calendar must reflect Saturday, Sunday and all Federal holidays as non-work days. Alternative calendars may be used with Contracting Officer approval.

(6) Project Level, Calculations Tab:

(a) Default Price/Unit for activities without resource or role Price/Units: Set to "$1/h".

(b) Activity percent complete based on activity steps: Must be Checked.

(c) Link Budget and At Completion for not started activities: Must be Checked.

(d) Reset Remaining Duration and Units to Original: Must be Selected.

(e) Subtract Actual from At Completion: Must be Selected.

(f) Recalculate Actual units and Cost when duration percent complete changes: Must be Checked.

(g) Update units when costs change on resource assignments: Must be Unchecked.

(h) Link Actual to Date and Actual This Period Units and Cost: Must be Checked.

(7) Project Level, Settings Tab:

(a) Define Critical Activities: Check "Longest Path".

(8) Work Breakdown Structure Level, Earned Value Tab:

(a) Technique for Computing Performance Percent Complete: "Activity percent complete" is selected.

(b) Technique for Computing Estimate to Complete (ETC): "PF = 1" is selected.

1.10.3 Required Tabular Reports and Native P6 XER Files

Include the following reports with the Baseline, Monthly Update and any other required NAS submittals:

a. Time Scaled Logic NAS

Provide formatted 11 by 17-inch Time-scaled Logic NAS in color and landscape-oriented with each NAS submittal. Clearly show activities on the longest path setting Gantt chart longest path activity bars to red. Group activities by WBS and sort by finish date in ascending order. Include the following information in column form for each activity and include accompanying Gantt chart:

(1) Activity ID

(2) Activity Name

(3) Original Duration

(4) Remaining duration

(5) Physical Percent Complete

(6) Start Date

(7) Finish Date

(8) Total Float

(9) Project-level Calendar

b. Previous Monthly Update Comparison Time Scaled Logic NAS (Submit with all Monthly NAS Update Submittals.)

Provide formatted 11 by 17-inch Time-scaled Logic NAS in color and landscape-oriented with each monthly NAS update submittal. Clearly show activities on the current month longest path setting Gantt chart longest path activities bars to red. Show previous month activities as yellow bars and previous month milestones in yellow within Gantt chart. Sort by finish date in ascending order. Filter activities for longest path. Maintain and assign the accepted previous monthly NAS update or the accepted baseline NAS for the first update submittal as the baseline and primary baseline in P6 before printing the NAS. Include the following information in column form for each activity and include accompanying Gantt chart:

(1) Activity ID

(2) Activity Name

(3) Original Duration

(4) Current Month Remaining Duration

(5) Current Month Start Date

(6) Previous Month Update Start Date (BL Project Start)

(7) Start Date Delta between Current Month and Previous Month (Variance - BL Project Start Date)

(8) Current Month Finish Date

(9) Previous Month Finish Date (BL Project Finish)

(10) Finish Date Delta between Current Month and Previous Month (Variance - BL Project Start Date)

(11) Current Month Total Float

c. P6 native XER file: Include the back-up native .xer program file

compatible with the current Government version of Primavera P6. Each native NAS file must have a unique file name to include project name and data date using (yyyy-mm-dd) convention. Each native NAS must have a unique Project ID and Project Name.

d. Log Report: P6 Scheduling/Leveling Report.

e. Narrative Report: Identify and justify:

Each entry in the Narrative Report must cite the respective Activity ID and Activity Name, the date and reason for any changes, and description of the change.

(1) Provide Project Summary Data in format below:

(a) Data Date _____

(b) Award Date: _____

(c) Original Project Duration: _____ days post Award Date

(d) Current Project Duration: _____ days post Award Date

(e) Time percent elapsed: _____ percent at data date

(f) Original CCD: _____

(g) Current CCD: _____ (thru MOD _____)

(h) Anticipated CCD: _____ (___ calendar days early/late)

(i) Original Contract Value: $_____

(j) Current Contract Value: $_____

(k) Invoiced Amount: $_____ (____ percent)

(l) Cost Growth: ____ percent

(m) NAS Growth: ____ percent

(n) There are a total of _____ activities, _____ activities complete (____ percent), ____ activities in progress (____ percent), _____ activities not started (____ percent). Of the in progress and not started activities; ____ (____ percent) are on the longest path. The longest path has duration of _____ calendar days from data-date to anticipated project completion.

(2) Progress made in each area of the project;

(3) Longest Path;

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

(5) Listing of all changes made between the previous monthly NAS update and current monthly NAS update include as a minimum: added or deleted activities, original and remaining durations for activities that have not started, logic (sequence constraint

lag/lead), milestones, planned sequence of operations, longest path, calendars or calendar assignments, and cost loading. Identify any other changes that relate to calculations within Oracle Primavera P6;

(6) Any decrease in previously reported activity Earned Amount;

(7) Pending items and status thereof, including permits, changes orders, and time extensions;

(8) Status of Contract Completion Date and interim milestones;

(9) Status of Projected Completion Milestone and account of difference in calendar days between previous update Projected Completion Milestone

(10) Current and anticipated delays listing Activity Names and IDs for impacted activities(describe cause of delay and corrective actions(s) and mitigation measures to minimize);

(11) Description of current and potential future NAS problem areas.

(12) Identification of any weather and restricted lost time as compared to anticipated weather for the month and anticipated restricted days for which the update is submitted. Impacts resulting from adverse weather must be documented in tabular form showing the calendar month (or billing period) with the days on which construction activity incurred Lost Work Days due to adverse weather. In narrative form, describe the adverse weather cause such as precipitation measurement, temperature, wind or other influencing factors, and why work was impacted. Identify the construction activity(s) by ID and Name that was (were) scheduled, impacted.

f. Earned Value Report: Derive from and correspond to P6 cost loaded Monthly NAS Update. List all activities having a budget amount cost loaded. Compile total earnings on the project from notice to proceed to current progress payment request. Show on the report for each activity:

(1) Current budget;

(2) Previous Physical Percent Complete;

(3) To-Date Physical Percent Complete;

(4) Previous Earned Value;

(5) To-Date Earned Value;

(6) Cost This Period;

(7) Cost to Complete.

g. Schedule Variance Control (SVC) Diagram: With each NAS submission, provide a SVC diagram representing only the current file showing 1) A Cash Flow Curve indicating planned project cost based on each of projected early and projected late activity finish dates and 2) one curve for Earned Value to-date. Revise Cash Flow Curves when the

contract is modified, or as directed by the Contracting Officer Include a legend on report clearly indication 3 curves: early finish, late finish, and earned-value to date.

Use the following settings in Activity Usage Profile Options:

(1) In the Data section, under Display, the radio box for Cost must be selected.

(2) In the Data section, under Filter for Bars/Graphs, the checkbox for Total must be checked.

(3) In the Show Bars/Curves section:

(a) Under the By Date column, the checkboxes for Baseline, Actual and Remaining Late must be checked. The checkboxes for Budgeted and Remaining Early must be unchecked.

(b) Under the Cumulative column, the checkboxes for Baseline, Actual and Remaining Late must be checked. The checkboxes for Budgeted and Remaining Early must be unchecked.

(c) Set the color for Baseline to green.

(d) Set the color for Actual to blue.

(e) Set the color for Remaining Late to red.

(4) In the Show Earned Value Curves section, the checkboxes for Planned Value Cost, Earned Value Cost and Estimate at Completion must be unchecked.

h. Logic Diagram showing timescale from data date to 60 days after data date with filter for longest path. Leave Group By selection blank and sort by finish date in ascending order.

i. Logic Diagram showing timescale from data date to contract completion date with filter for longest path. Leave Group By selection blank and sort by finish date in ascending order.

j. Baseline or Monthly Update Checklist as applicable completed and certified by Qualified Scheduler. Contractor Baseline Project Schedule Review, Contractor Monthly Update Schedule Review, and Contractor Baseline Project Schedule, and General Commissioning/HVAC Review Checklist. Checklists can be found on the Whole Building Design Guide website as Related Materials to UFGS 01 32 17.00 20.

k. Screen shot PDF of Primavera P6 Time Periods Settings referenced in paragraph NAS SOFTWARE SETTINGS AND RESTRICTIONS, list item c.(2): ADMIN DROP-DOWN MENU, ADMIN PREFERENCES, TIME PERIODS TAB

l. Screen shot PDF of Primavera P6 Earned Value Settings referenced in paragraph NAS SOFTWARE SETTINGS AND RESTRICTIONS, list item c.(3): ADMIN DROP-DOWN MENU, ADMIN PREFERENCES, EARNED VALUE TAB

m. Daily Reported Production Activity: Submit on a monthly basis, in electronic spreadsheet, summary of daily reported production activity for the reporting month in the update NAS. Use the following columns for reporting:

(1) Date

(2) Activity ID

(3) Work Description

(4) Contractor

(5) Billable Hours

n. HVAC/COMMISSIONING KTR Checklist. See Specification D30 HVAC for checklist requirements. Complete checklist listing all items with baseline submittal. Complete checklist as required to complete project, submitting complete checklist in intermediately following monthly update submittal.

1.11 CONTRACT MODIFICATION

1.11.1 Time Impact Analysis (TIA)

Submit a Time Impact Analysis with each cost and time proposal for a proposed change. TIA must 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, impacts the longest path, and extends the Projected Completion beyond the Contract Completion Date.

a. Each TIA must be in both narrative and NAS form. The narrative must:

(1) Define the scope and conditions of the change;

(2) Provide start and finish dates of impact to longest path;

(3) Identify and include any accepted NAS referenced in TIA and any changes made to accepted NAS to prepare additional NAS included in the TIA;

(4) Successor(s) and predecessor(s) activities to impact period;

(5) Responsible party;

(6) Describe how the impact originated;

b. The TIA submission must consist of at least three native XER files:

(1) Fragnet used to define the scope of the changed condition

(2) Most recent accepted baseline NAS or monthly NAS update as of the time of the impact start date. If the data date of this NAS is different than the start date of impact, update this NAS to show all activity progress as of the time of the impact start. The impact start date is identified as the time when an existing activity is impeded for either starting or finishing. This NAS must have a data date that is the same as the identified start date of impact in "a.(2)". Identify any changes made to most recent accepted NAS.

(3) The impacted NAS that has the Fragnet inserted in the updated NAS

from "b.(2)" and the NAS scheduled using the Schedule command in Oracle Primavera P6 so that the new completion date is determined.

c. For claimed as-built project delay, the inserted Fragnet TIA method must be modified to account for as-built events known to occur after the data date of NAS update used. Updated NAS for periods following the impact start date will be used and included in submittal to evaluate how the project progressed (as-built) through the finish of impact. Impact to longest path must be determined for each following update period.

d. All TIAs must include any mitigation, and must determine the apportionment of the overall delay assignable to each individual delay. Apportionment must provide identification of delay type and classification of delay by compensable and non-compensable events. The associated narrative must clearly describe analysis methodology used, and the findings in a chronological listing beginning with the earliest delay event.

(1) Identify and classify types of delay defined as follows:

(a) Force majeure delay (e.g., weather delay): Any delay event caused by something or someone other than the Government or the Contractor, or the risk of which has not been assigned solely to the Government or the Contractor. If the force majeure delay is on the longest path, in absence of other types of concurrent delays, the Contractor is granted an extension of contract time, classified as a non-compensable event.

(b) A Contractor-delay: Any delay event caused by the Contractor, or the risk of which has been assigned solely to the Contractor. If the contractor-delay is on the longest path, in absence of other types of concurrent delays, Contractor is not granted extension of contract time, and classified as a non-compensable event. Where absent other types of delays, and having impact to project completion, Contractor must provide to Contracting Officer a Corrective Action Plan identifying plan to mitigate delay.

(c) A Government-delay: Any delay event caused by the Government, or the risk of which has been assigned solely to the Government. If the Government-delay is on the longest path, in absence of other types of concurrent delays, the Contractor is granted an extension of contract time, and classified as a compensable event.

(2) Functional concurrency must be used to analyze concurrent delays, where: separate delay issues delay project completion, do not necessarily occur at same time, rather occur within same monthly NAS update period at minimum, or within same as-built period under review. If a combination of functionally concurrent delay types occurs, it is considered Concurrent Delay, which is defined in the following combinations:

(a) Government-delay concurrent with contractor-delay: excusable time extension, classified non-compensable event.

(b) Government-delay concurrent with force majeure delay:

excusable time extension, classified non-compensable event.

(c) Contractor-delay concurrent with force majeure delay: excusable time extension, classified non-compensable event.

(3) Pacing delay reacting to another delay (parent delay) equally or more critical than paced activity must be identified prior to pacing. Contracting Officer will notify Contractor prior to pacing. Contractor must notify Contracting Officer prior to pacing. Notification must include identification of parent delay issue, estimated parent delay time period, paced activity(s) identity, and pacing reason(s). Pacing Concurrency is defined as follows:

(a) Government-delay concurrent with contractor-pacing: excusable time extension, classified compensable event.

(b) Contractor-delay concurrent with Government-pacing: inexcusable time extension, classified non-compensable event

e. Submit electronic files containing the narrative and the Native XER NAS files used and or referenced in the time impact analysis.

1.12 PROJECT FLOAT

Project Float is the length of time between the Project Completion Milestone and the Contract Completion Date. Project Float available in the NAS will not be for the exclusive use of either the Government or the Contractor.

The use of Resource Leveling is prohibited. Techniques used for the purpose of artificially adjusting activity durations to consume float and influence longest path are prohibited.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 33 00.05 20

CONSTRUCTION SUBMITTAL PROCEDURES
05/14, CHG 5: 03/23

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 Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES. When using Unified Facility Guide Specifications (UFGS) sections that reference Section 01 33 00 SUBMITTAL PROCEDURES, change reference to this section, Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES.

1.2 SUBMITTAL DESCRIPTIONS (SD)

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

SD-01 Preconstruction Submittals

Certificates of insurance.

Surety bonds.

List of proposed subcontractors.

List of proposed products.

Construction progress schedule.

Network Analysis Schedule (NAS)

Submittal register.

Schedule of prices or earned value report.

Health and safety plan.

Work plan.

Quality control and commissioning plans.

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.

Manufacturer's data certifying and demonstrating that specific product, process, and/or conditions complies with applicable Guiding Principle GP) or Third Party Certification (TPC) criteria.

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 ensuing 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.

Text of posted operating instructions.

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, Guiding Principles Validation or Sustainability Third Party Certification (TPC), Sustainability eNotebook (including all of components) and eOMSI submittals. 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.

The use of an "S" following a submittal indicates separate but simultaneous submittal is required as part of federally mandated sustainability requirements. Refer to Section 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING for "S" submittal requirements.

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

SD-01 Preconstruction Submittals

Submittal Register Format; G

Shop Drawings; G

SD-03 Product Data

Data Sheets; G

Calculations; G

SD-06 Test Reports

Preliminary Test Reports; G

SD-07 Certificates

Certificates; G

1.3.1 Submittal Register

The submittal register must 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.

a. 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 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.

b. 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.

c. DOR must 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 transmittal forms and the submittal register for each design submittal package. In addition, the DOR professional stamp on the final design submittal indicates approval of construction submittals combined with the design submittal.

d. 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.

e. Construction submittals that are approved by the DOR or certified by the QC are required to be submitted to the Government for for record only, except when the RFP requires the design and construction submittals to be combined in Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES or where specified in the paragraph SUBMITTALS RESERVED FOR GOVERNMENT SURVEILLANCE of this section.

f. In addition to other approvals that may be required, provide review and approval of Guiding Principles Validation and TPC Submittals by Design-Build team's Sustainability or TPC Professional. Provide this approval prior to including in any Government-reviewed submittal.

1.4.2 Submittals Reserved for Government Surveillance

Surveillance submittals are approved by the Contractor in accordance with paragraph CONTRACTOR REVIEWING, CERTIFYING, 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 must 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 shop drawings, data sheets, calculations, preliminary test reports, and certificates pertaining to the following systems: spray-applied fire proofing and fire stopping, exterior fire alarm reporting systems, interior fire alarm detection systems and releasing systems, and fire suppression systems including fire pumps, standpipe systems, and controllers.

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 shop drawings, product data sheets, design data, test reports, certificates and warranties pertaining to materials and

systems used to make up the roof system.

e. Submit shop drawings, product data, and installer qualifications for the following exterior underground mechanical systems: steam, hot-water, chilled water, and condenser water.

f. Submit shop drawings, data sheets, calculations, and installer qualifications as described in Part 4, D50 ELECTRICAL.

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

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

i. Submit all Interim Special Inspection Reports on a bi-weekly basis until work requiring special inspections is complete.

j. Submit all Structural Observation Reports and the Final Report of Special Inspections.

k. Submit Final Guiding Principle Validation and TPC sustainability documentation.

l. Submit building enclosure testing results for air tightness and the infrared thermography results if air barrier deficiencies are identified. Describe actions taken to correct building enclosure deficiencies at each location.

1.4.3 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 TEMPORARY ENVIRONMENTAL CONTROLS.

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

a. Transformers

b. Specification D30 HVAC

c. Fire Protection Systems: Submit fire protection shop drawings, data sheets, calculations, preliminary test reports, and certificates pertaining to the following systems: spray-applied fire proofing and fire stopping, exterior fire alarm reporting systems, interior fire alarm detection systems and releasing systems, and fire suppression systems including fire pumps, standpipe systems, and controllers.

d. Electrical systems: Performance Verification Plan (PVT) in accordance with Part 4, D50 ELECTRICAL.

e. Section 25 05 11 CYBERSECURITY FOR FACILITY-RELATED CONTROL SYSTEMS

1.4.3.1 Scheduling for Government Approved Submittals

Except as specified otherwise, allow review period, beginning when Government receives submittal from the QC organization, of 30 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.

1.4.3.2 Government Approval Defined

Submittals marked "approved" indicate a quality assurance (QA) review has been performed. Government review or approval of any portion of the submittal does not relieve the Contractor from responsibility for meeting the contract requirements or for any error that may exist, because under the Quality Control (QC) requirements of this contract, the Contractor is responsible for ensuring information contained within each submittal accurately conforms with the requirements of the contract documents. Furthermore, Government review or approval of a submittal is not to be construed as a complete check.

1.4.4 Constraints

a. Submittals must 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 Design Change and Variation

The Contractor must limit change and variation to items that will be advantageous to the Government. Submit proof that the change or variation is needed and provide the same or better level of quality as the design that the Government originally reviewed or approved. Design change is considered prior to Government approval of the final design and variation is considered after Government approval of final design.

1.4.5.1 Design Changes

Design changes must meet the minimum requirements of the solicitation and the accepted proposal. Any changes to the design from what was previously reviewed by the Government during any phase of the design process prior to Government approval of the Final Design must be approved by the DOR and Government before the design change may be incorporated into the design documents. Design changes must be requested in accordance with Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES.

1.4.5.2 Variations

Variations from contract requirements including the solicitation, the accepted proposal, and the final design, require Government approval. Variations must be approved by the DOR prior to submitting written request to the Government for approval.

a. Considering Variations

b. Discuss the proposed variation with the Contracting Officer after

consulting with the DOR prior to submission to help ensure functional and quality requirements are met and minimize potential rejections and re-submittals. When contemplating a variation which results in lower cost, consider submitting the variation as a Value Engineering Change Proposal (VECP) in accordance with FAR 52.248-3 Value Engineering-Construction. Specifically point out variations from contract requirements in transmittal letters and variation submittal as applicable. Failure to receive prior Government approval for deviations may result in the Government requiring rejection and removal of such work at no additional cost to the Government.

c. Submitting Variations

d. When submitting a variation, deliver the written request and submittal clearly marked as a variation on all pages to the Contracting Officer in the form of a Request for Information (RFI) to include documentation illustrating the nature and features of the variation including any necessary technical submittals and why the variation is desirable and beneficial to Government. Request must also include any savings to the government with estimate of savings amount. Provide written documented analysis and approval from the DOR.

e. The Contracting Officer will indicate an approval or disapproval of the variation request; and if not approved as submitted, will indicate the Government's reasons therefor. Any work done before such approval is received is performed at the Contractor's risk.

f. Warranting Variations Are Compatible

g. When proposing a variation for approval, the Contractor, including its Designer(s) of Record, warrants that the contract documents have been reviewed to establish that the variation, if incorporated, is compatible with the design intent and operational requirements.

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 must be QC organization member designated in the approved QC plan. The signatures must 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 the Designer of Record, the DOR must 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 must 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 must be QC organization member designated in the approved QC plan. The signatures must 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 must be resubmitted with appropriate changes. No work is allowed to 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.

1.5.1.2 Sustainable Design and Construction Submittals

On all projects, provide sustainability submittals in accordance with requirements of this document, specification Section 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING and FC 1-300-09N, "Navy and Marine Corps Design Procedures". Specific submittal requirements are also identified in technical sections of the specifications. Separate out data demonstrating compliance with construction sustainability requirements and submit separately but concurrently.

1.5.2 Identifying Submittals

When submittals are provided by a Subcontractor, the Prime Contractor is to prepare, review and stamp with Contractor's approval all specified submittals prior to submitting for Government approval.

Identify submittals, except sample installations and sample panels, with the following information permanently adhered to or noted on each separate

component of each submittal and noted on transmittal form. Mark each copy of each submittal identically, with the following:

a. Project title and location.

b. Construction contract number.

c. Date of the drawings and revisions.

d. Name, address, and telephone number of subcontractor, supplier, manufacturer and any other subcontractor associated with the submittal.

e. Section number of the specification section by which submittal is required.

f. Submittal description (SD) number of each component of submittal.

g. When a resubmission, add alphabetic suffix on submittal description, for example, submittal 18 would become 18A, to indicate resubmission.

h. Product identification and location in project.

1.5.3 Format for SD- 02 Shop Drawings

a. Shop drawings are not to be less than 8 1/2 by 11 inches nor more than 30 by 42 inches, except for full size patterns or templates. Prepare drawings to accurate size, with scale indicated, unless other form is required. Drawings are to be suitable for reproduction and be of a quality to produce clear, distinct lines and letters with dark lines on a white background.

b. Present 8 1/2 by 11 inches sized shop drawings as part of the bound volume for submittals required by section. Present larger drawings in sets.

c. Include on each drawing the drawing title, number, date, and revision numbers and dates, in addition to information required in paragraph IDENTIFYING SUBMITTALS of this section.

d. Number drawings in a logical sequence. Contractors may use their own number system. Each drawing is to bear the number of the submittal in a uniform location adjacent to the title block. Place the Government contract number in the margin, immediately below the title block, for each drawing.

e. Reserve a blank space on the right-hand side of each sheet for the Government disposition stamp.

f. Dimension drawings, except diagrams and schematic drawings; prepare drawings demonstrating interface with other trades to scale. Use the same unit of measure for shop drawings as indicated on the contract drawings. Identify materials and products for work shown.

g. Include the nameplate data, size and capacity on drawings. Also include applicable federal, military, industry and technical society publication references.

1.5.4 Format of SD - 03 Product Data and SD - 08 Manufacturer's Instructions

a. Present product data submittals for each section as a complete bound volume. Include table of contents, listing page and catalog item numbers for product data.

b. Indicate, by prominent notation, each product which is being submitted; indicate specification section number and paragraph number to which it pertains.

c. Supplement product data with material prepared for project to satisfy submittal requirements for which product data does not exist. Identify this material as developed specifically for project, with information and format as required for submission of SD-07 Certificates.

d. Provide product data in metric dimensions. Where product data are included in preprinted catalogs with English units only, submit metric dimensions on separate sheet.

e. Include the manufacturer's name, trade name, place of manufacture, and catalog model or number on product data. Also include applicable federal, military, industry and technical society publication references. Should manufacturer's data require supplemental information for clarification, submit as specified for SD-07 Certificates.

f. Where equipment or materials are specified to conform to industry and technical society reference standards of the organizations such as American National Standards Institute (ANSI), ASTM International (ASTM), National Electrical Manufacturer's Association (NEMA), Underwriters Laboratories (UL), and Association of Edison Illuminating Companies (AEIC) submit proof of such compliance. The label or listing by the specified organization is acceptable evidence of compliance. 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. State on the certificate 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.

g. Collect required data submittals for each specific material, product, unit of work, or system into a single submittal and marked for choices, options, and portions applicable to the submittal. Mark each copy of the product data identically. Partial submittals will not be accepted for expedition of construction effort.

h. Submit manufacturer's instructions prior to installation.

1.5.5 Format of SD - 04 Samples

Furnish samples in sizes below, unless otherwise specified or unless the manufacturer has prepackaged samples of approximately same size as specified:

a. Sample of Equipment or Device: Full size.

b. Sample of Materials Less than 2 by 3 inches: Built up to 8 1/2 by 11

inches.

c. Sample of Materials Exceeding 8 1/2 by 11 inches: Cut down to 8 1/2 by 11 inches and adequate to indicate color, texture, and material variations.

d. Sample of Linear Devices or Materials: 10 inch length or length to be supplied, if less than 10 inches. Examples of linear devices or materials are conduit and handrails.

e. Sample of Non-Solid Materials: 1.6 pints. Examples of non-solid materials are sand and paint.

f. Color Selection Samples: 2 by 4 inches. Where samples are specified for selection of color, finish, pattern, or texture, submit the full set of available choices for the material or product specified. Sizes and quantities of samples are to represent their respective standard unit.

g. Sample Panel: 4 by 4 feet.

h. Sample Installation: 100 square feet.

i. Samples Showing Range of Variation: Where variations in color, finish, pattern, or texture are unavoidable due to nature of the materials, submit sets of samples of not less than three units showing extremes and middle of range. Mark each unit to describe its relation to the range of the variation.

j. Reusable Samples: Incorporate returned samples into work only if so specified or indicated. Incorporated samples are to be in undamaged condition at time of use. Recording of Sample Installation: Note and preserve the notation of area constituting sample installation but remove notation at final clean-up of project.

When color, texture or pattern is specified by naming a particular manufacturer and style, include one sample of that manufacturer and style, for comparison.

1.5.6 Format of SD - 05 Design Data and SD - 07 Certificates

Provide design data and certificates on 8 1/2 by 11 inches paper. Provide a bound volume for submittals containing numerous pages.

1.5.7 Format of SD-06 Test Reports and SD - 09 Manufacturer's Field Reports

Provide reports on 8 1/2 by 11 inches paper in a complete bound volume. Indicate by prominent notation, each report in the submittal. Indicate specification number and paragraph number to which it pertains.

1.5.8 Format of SD - 10 Operation and Maintenance Data (O&M)

Comply with the requirements specified in Section 01 78 23 OPERATION AND MAINTENANCE DATA for O&M Data format.

1.5.9 Format of SD - 01 Preconstruction Submittals and SD - 11 Closeout Submittals

When submittal includes a document, which is to be used in project or

become part of project record, other than as a submittal, do not apply Contractor's approval stamp to document, but to a separate sheet accompanying document.

Provide all dimensions in administrative submittals in English.

1.6 QUANTITY OF SUBMITTALS

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. 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 Electronic Submittals

Where practicable, in lieu of hard copy copies, construction submittals may be transmitted electronically with approval from the Contracting Officer.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

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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					
							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	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 14 00	SD-01 Preconstruction Submittals															
			List of Contact Personnel	1.4.1.1														
		01 20 00	SD-01 Preconstruction Submittals															
			Earned Value Report	1.3	G													
		01 30 00	SD-01 Preconstruction Submittals															
			View Location Map	1.3	G													
			Progress and Completion	1.4	G													
			Pictures															
			Design Submittal Packaging	1.8.1	G													
			Performance Assessment Plan	1.12	G													
			(PAP)															
		01 31 23.13 20	SD-01 Preconstruction Submittals															
			List of Contractor's Personnel	1.4.2	G													
		01 32 17.00 20	SD-01 Preconstruction Submittals															
			Baseline NAS	1.2.2.1	G													
			Construction Baseline NAS	1.2.2.3	G													
			Designated Project Scheduler	1.9	G													
			SD-07 Certificates															
			Weekly Look Ahead Schedule	1.3														
			Monthly NAS Updates	1.4.2	G													
			SD-11 Closeout Submittals															
			As-Built NAS	1.4.3	G													
		01 33 00.05 20	SD-01 Preconstruction Submittals															
			Submittal Register	1.3.1	G													
			Shop Drawings	1.4.2	G													
			Shop Drawings	1.4.2	G													

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		01 33 00.05 20	Shop Drawings	1.4.2	G													
			Shop Drawings	1.4.2	G													
			Shop Drawings	1.4.2	G													
			Shop Drawings	1.4.3	G													
			SD-03 Product Data															
			Data Sheets	1.4.2	G													
			Data Sheets	1.4.2	G													
			Data Sheets	1.4.2	G													
			Data Sheets	1.4.3	G													
			Calculations	1.4.2	G													
			Calculations	1.4.2	G													
			Calculations	1.4.3	G													
			SD-06 Test Reports															
			Preliminary Test Reports	1.4.2	G													
			Preliminary Test Reports	1.4.3	G													
			SD-07 Certificates															
			Certificates	1.4.2	G													
			Certificates	1.4.2	G													
			Certificates	1.4.3	G													
		01 33 10.05 20	SD-01 Preconstruction Submittals															
			Consolidated RFP Documents	2.1	G													
			Submittal Register	1.6.5	G													
			SD-04 Samples															
			Rendering	1.12.2	G													
			SD-05 Design Data															
			Design Drawings	1.8	G													

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		01 33 10.05 20	Specifications	1.10	G													
			Basis of Design	1.11	G													
			Design Submittals	2.2	G													
			Project Rendering	1.12	G													
			BIM Project Execution Plan (PxP)	1.9	G													
			Design Model	1.9	G													
			Visual Review Report	1.9	G													
			Clash Detection Report	1.9	G													
			Historic Preservation and	1.11.3	G													
			Planning Commission Submission															
			SD-11 Closeout Submittals															
			Record Documents	1.13	G													
			DD Form 1354	1.13.3	G													
			Record Model	1.9	G													
		01 33 29	SD-01 Preconstruction Submittals															
			Preliminary High Performance	1.5.3.2	G	S												
			and Sustainable Building Checklist															
			Sustainability Action Plan	1.4.1	G	S												
			Preliminary Sustainability	1.5.3.2	G	S												
			eNotebook															
			SD-05 Design Data															
			Interim Design High Performance	1.5.3.2	G	S												
			and Sustainable Building Checklist															
			Interim Design Sustainability	1.5.3.2	G	S												
			eNotebook															

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 33 29	Final Design High Performance	1.5.3.2	G	S												
			and Sustainable Building Checklist															
			Final Design Sustainability	1.5.3.2	G	S												
			eNotebook															
			SD-06 Test Reports															
			Third-Party Certification Design	1.5.3.2	G	S												
			Compliance Report															
			SD-11 Closeout Submittals															
			Final High Performance and	1.5.3.2	G	S												
			Sustainable Building Checklist															
			Final Sustainability eNotebook	1.5.3.2	G	S												
			Amended Final Sustainability	1.5.3.2	G	S												
			eNotebook															
			Amended Final High	1.5.3.2	G	S												
			Performance and Sustainable															
			Building Checklist															
			Third-Party Certification	3.2	G	S												
			Certificate, Assessment, or															
			Validation and Compliance Report															
		01 35 13	SD-01 Preconstruction Submittals															
			Existing Conditions Survey	3.1.1.2														
			Construction Operations Plan	3.1.1.1														
			SD-04 Samples															
			Model Unit	3.2.3														
		01 35 26	SD-01 Preconstruction Submittals															

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 35 26	Accident Prevention Plan (APP)	1.9.1	G													
			Design															
			Accident Prevention Plan (APP)	1.9.2	G													
			Construction															
			Final IAQ Management Plan	1.16	S													
			Indoor Air Quality (IAQ)	1.16	G													
			Management Plan															
			SD-06 Test Reports															
			Accident Reports	1.13.2	G													
			LHE Inspection Reports	1.13.3														
			Monthly Exposure Reports	1.5	G													
			SD-07 Certificates															
			Activity Hazard Analysis (AHA)	1.10	G													
			Certificate of Compliance	1.13.4														
			Contractor Safety Self-Evaluation	1.6														
			Checklist															
			Hot Work Permit	1.14														
			Standard Lift Plan	1.13.4.2	G													
			Critical Lift Plan	1.13.4.2	G													
		01 45 00	SD-01 Preconstruction Submittals															
			Contractor Quality Control (CQC)	1.5.2	G													
			Plan															
			Additional Requirements For	1.5.2.2	G													
			Design Quality Control (DQC) Plan															
			SD-05 Design Data															
			Design Quality Control	1.12.2														

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		01 45 00	Discipline-Specific Checklists	1.5.2.2														
			Design Quality Control	1.6.3.2														
			Documentation (DQCD)															
			SD-06 Test Reports															
			Verification Statement	1.12.3														
			SD-07 Certificates															
			Certificate Of Readiness	1.6.7.1	G													
		01 45 35	SD-01 Preconstruction Submittals															
			SIOR Letter of Acceptance	3.1.1	G													
			Project Manual	3.1.1	G													
			Written NDT Practices	3.1.1														
			Written NDT Practices	3.1.3														
			SD-06 Test Reports															
			Special Inspection Daily Reports	3.1.1														
			Special Inspection Daily Reports	3.1.3														
			Special Inspection Daily Reports	3.1.3														
			Special Inspection Biweekly	3.1.1														
			Reports															
			SD-07 Certificates															
			AISC Certified Steel Fabricator	2.1														
			Steel Truss Plant Quality	2.1														
			Assurance Program															
			Wood Truss Plant Quality	2.1														
			Assurance Program															
			AC472 Accreditation	2.1														
			Certified Plant	2.1														

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		01 45 35	Certificate of Compliance	2.1														
			Special Inspector of Record	1.5	G													
			Special Inspector of Record	1.5.17	G													
			Special Inspector	1.5	G													
			Qualification Records for	3.1.1														
			Nondestructive Testing															
			Technicians															
			Qualification Records for	3.1.3														
			Nondestructive Testing															
			Technicians															
			SD-11 Closeout Submittals															
			Interim Report	3.1.1	G													
			Interim Report	3.1.3	G													
			Comprehensive Final Report	3.1.1	G													
			Comprehensive Final Report	3.1.3	G													
			Final Report	3.1.4	G													
		01 50 00	SD-01 Preconstruction Submittals															
			Construction Site Plan	1.3	G													
			Traffic Control Plan	3.3.1	G													
			Haul Road Plan	2.2.1	G													
			Contractor Computer	1.6.1.4	G													
			Cybersecurity Compliance															
			Statements															
			Contractor Temporary Network	1.6.6	G													
			Cybersecurity Compliance															
			Statements															

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 50 00	SD-06 Test Reports															
			Backflow Preventer Tests	3.4														
			SD-07 Certificates															
			Backflow Tester	1.4.1														
			Backflow Preventers	1.4														
		01 57 19	SD-01 Preconstruction Submittals															
			Contractor Hazardous Material	3.8.1	G													
			Inventory Log															
			Soil Management Plan	1.5.1.1.1	G													
			Laboratory	1.5.1.1.1	G													
			Certifications/Accreditations															
			Imported Fill Management Plan	1.5.1.1.2	G													
			Imported Fill Summary Report	1.5.1.1.2	G													
			Dewatering Work Plan	1.5.1.1.5	G													
			Waste Management and	1.5.1.1.3	G													
			Sampling Plan															
			Storage Material Inventory	1.5.2														
			Preconstruction Survey	1.6.1														
			Regulatory Notifications	1.6.2														
			Environmental Manager	1.6.4														
			Qualifications															
			Employee Training Records	1.6.5														
			Environmental Protection Plan	1.7	G													
			Dirt and Dust Control Plan	1.7.9.1														
			Solid Waste Management Permit	1.10														

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 57 19	Stormwater Pollution Prevention	3.2.1.1	G													
			Plan															
			Stormwater Notice of Intent	3.2.1.2														
			Spill Prevention Control And	3.14.2	G													
			Countermeasure (SPCC) Plan															
			SD-06 Test Reports															
			Monitoring Results	1.5.1.1.5.3	G													
			Monthly Solid Waste Disposal	1.10.1	G													
			Report															
			Inspection Reports	3.2.1.3														
			Laboratory Analysis	3.7.1.1.2														
			SD-07 Certificates															
			ECATTS Certificate Of	1.4.1.2	G													
			Completion															
			Employee Training Records	1.6.5	G													
			SD-11 Closeout Submittals															
			Contractor Hazardous Material	3.8.1	G													
			Inventory Log															
			Regulatory Notifications	1.6.2	G													
			Assembled Employee Training	1.6.5	G													
			Records															
			Solid Waste Management Permit	1.10	G													
			Stormwater Pollution Prevention	3.2.1.4	G													
			Plan Compliance Notebook															
			Stormwater Notice of Termination	3.2.1.5	G													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
B550 Repairs

CONTRACTOR

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	Waste Determination	3.7.1	G													
			Documentation															
			Project Solid Waste Disposal	3.7.2.1	G													
			Documentation Report															
			Sales Documentation	3.7.2.1	G													
			Contractor Certification	3.7.2.1														
			Hazardous Waste/Debris	3.7.3.1	G													
			Management															
			Disposal Documentation for	3.7.3.6	G													
			Hazardous and Regulated Waste															
			Hazardous Waste Inspection	3.21.1.1	G													
			Logs															
		01 74 19	SD-01 Preconstruction Submittals															
			Construction Waste Management	1.6	G													
			Plan															
			SD-11 Closeout Submittals															
			Final Construction Waste	1.8	S													
			Diversion Report															
		01 78 00	SD-03 Product Data															
			Warranty Management Plan	1.6.1														
			Warranty Tags	1.6.4														
			Final Cleaning	3.3														
			Spare Parts Data	1.5														
			SD-08 Manufacturer's Instructions															
			Instructions	1.6.1														
			SD-11 Closeout 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	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 78 00	As-Built Drawings	3.1	G													
			Record Drawings	3.2	G													
			Warranted Equipment and	1.6.1														
			Materials															
			Certification of EPA Designated	2.1	G													
			Items															
			Certification Of USDA Designated	2.2	G													
			Items															
			Interim DD FORM 1354	3.4.1	G													
			High Performance and	3.4.2	G													
			Sustainable Building (HPSB)															
			Checklist															
			List Of Installed Building	3.4.2														
			Equipment Items For DD Form															
			1354															
		01 78 23	SD-10 Operation and Maintenance															
			Data															
			Facility Data Workbook	1.4	G													
			Training Plan	3.1.1	G													
			Training Outline	3.1.3	G													
			Training Content	3.1.2	G													
			Operation And Maintenance	3.2.1	G													
			Manual, Progress Submittal															
			Operation And Maintenance	3.2.2	G													
			Manual, Prefinal Submittal															

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
B550 Repairs

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					
							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	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 78 23	Operation And Maintenance	3.2.3	G													
			Manual, Final Submittal															
			SD-11 Closeout Submittals															
			Training Video Recording	3.1.4	G													
			Validation of Training Completion	3.1.6	G													
			Training Plan	3.1.1	G													
			Record Drawings And Utility	1.6.6.7	G													
			Systems															
		01 78 24.00 20	SD-11 Closeout Submittals															
			Facility Data Workbook (FDW),	1.3.1	G													
			Progress Submittal															
			Facility Data Workbook (FDW),	1.3.2	G													
			Prefinal Submittal															
			Facility Data Workbook (FDW),	1.3.3	G													
			Final Submittal															
		01 91 19	SD-01 Preconstruction Submittals															
			Building Enclosure Testing Work	1.8	G													
			Plan															
			PRELIMINARY BECx PLAN	3.3	G													
			SD-03 Product Data															
			Thermal Imaging Camera	2.3	G													
			Test Equipment	2.1	G													
			SD-05 Design Data															
			Envelope Surface Area	3.9.2	G													
			Calculations															
			SD-06 Test Reports															

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
B550 Repairs

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					
							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	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 91 19	Completed Building Envelope	3.8	G													
			Inspection Checklists															
			Pressure Test Procedures	3.9.5	G													
			Air Leakage Test Report	1.12.3	G													
			Air Leakage Test Report	3.9.5.6	G													
			Diagnostic Test Report	1.12.3	G													
			Diagnostic Test Report	3.9.6.6	G													
			FINAL BECx PLAN	3.5	G													
			FINAL BECx REPORT	3.11	G													
			SD-07 Certificates															
			Pressure Test Agency	1.12.2.1														
			Thermographer Qualifications	1.12.2.2														
			Certificate of Readiness	1.14														
			SD-10 Operation and Maintenance															
			Data															
			Training	3.10	G													

SECTION 01 33 10.05 20

DESIGN SUBMITTAL PROCEDURES
05/17, CHG 7: 03/25

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.

U.S. DEPARTMENT OF DEFENSE (DOD)

FC 1-300-09N	(2024) Navy and Marine Corps Design
UFC 1-200-01	(2022; with Change 4, 2024) DoD Building Code
UFC 1-300-08	(2023) Criteria for Transfer and Acceptance of DoD Real Property
UFC 4-010-06	(2023) Cybersecurity of Facility-Related Control Systems

1.3 UFC 1-200-02

UFC 1-200-01 requires compliance with UFC 1-200-02, "High Performance and Sustainable Building Requirements".

1.4 GENERAL DESIGN REQUIREMENTS

Contractor-originated design documents must provide a project design that complies with the Request For Proposal (RFP), FC 1-300-09N, UFC 1-200-01, the Core UFCs, and other UFC's listed above.

1.5 SUBMITTALS

Submit design submittals, including shop drawings used as design drawings, 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.

Submittals with an "S" are for inclusion in the Sustainability eNotebook in conformance to Section 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING for "S" submittal requirements. 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

Basis of Design; G

Design Submittals; G

Project Rendering; G

BIM Project Execution Plan (PxP); G

Design Model; G

Visual Review Report; G

Clash Detection Report; G

Historic Preservation and Planning Commission Submission; G

SD-11 Closeout Submittals

Record Documents; G

DD Form 1354; G

Final Record Model; G

1.6 DESIGN QUALITY CONTROL

1.6.1 Contractor Reviewing and Certifying Authority

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

1.6.2 Government Approving Authority

The Contracting Officer is the approving authority for design submittals.

1.6.3 Designer of Record Certifying Authority

The Designer of Record (DOR), as registered and defined in FC 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.

1.6.4 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, except as specified in the following paragraph.

1.6.4.1 Exception to Contractor Construction Actions

The Government will approve the following final submittals before the Contractor shall be allowed to proceed with construction:

a. Any design submittal that includes or will be impacted by a design change to the contract. Final Government approval of the design change is required before construction can begin on the work included in that design submittal.

b. Elevator design.

1.6.5 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 must coordinate all design segments of the project to assure consistency of design between design disciplines.

b. With the Designer of 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. Indicate on the transmittal form accompanying submittal which design submittals are being submitted as shop drawings.

d. Advise Contracting Officer of variations, as required by paragraph DESIGN CHANGE AND VARIATIONS.

e. 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.

f. Refer to Section 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING for Contractor's responsibilities for Guiding Principle Validation and Third Party Certification.

g. Refer to Section 01 78 24.00 20 FACILITY DATA WORKBOOK (FDW) for Contractor's eOMSI responsibilities.

h. Refer to Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING for design review responsibilities of the commissioning provider.

1.6.6 QC Organization Responsibilities

a. Both the Commissioning Authority (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 must 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 DQC Manager _____, Date _____

Certified by QC Manager _____, Date _____"

c. Sign certifying statement. The persons signing certifying statements must be the QC organization members designated in the approved QC plan. The signatures must 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.

1.6.7 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.

1.6.7.1 Actions Possible

Submittals will be returned with one of the following notations:

a. Submittals may be marked "approved." Submittals marked "approved" indicate a quality assurance (QA) review has been performed. Government review or approval of any portion of the proposal or final design does not relieve the Contractor from responsibility for meeting the contract requirements or for any error that may exist, because under the Quality Control (QC) requirements of this contract, the Contractor is responsible for ensuring information contained within each submittal accurately conforms with the requirements of the contract documents. Furthermore, Government review or approval of a submittal is not to be construed as a complete check.

b. Submittals marked "not reviewed" 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 must be resubmitted with appropriate changes. If work has been started on the unacceptable portion of the design submittal, the Contractor must propose corrective action. No further work is allowed to proceed until the issue is resolved in a manner satisfactory to the Government.

1.7 DESIGN DOCUMENTS

Provide design documents that include basis of design, design drawings, and design specifications, reports, and submittal register in accordance with FC 1-300-09N, Navy and Marine Corps Design Procedures.

The Contractor is encouraged to make product, material, and system selections during the project design and indicate these choices on the design documents. Accomplish this by submitting design drawings and specifications that include proprietary submittal information such as manufacturers name, product names, model numbers, product data, manufactures information, provided optional features, appropriate connections, fabrication, layout, and product specific drawings. Adherence to RFP submittal requirements and provision of DOR approved construction submittal information on the design submittals - eliminates the need for follow-on traditional construction submittals after the final design is approved.

The Contractor is required to submit proprietary information to describe the construction submittal information in the design documents for all products, materials, and systems submittals listed below:

a. All building enclosure components.

b. All roof components.

c. Major mechanical and electrical equipment.

d. Interior finishes.

All products, materials, and systems on the project.

Refer to Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES for requirements pertaining to Contractor proposed design changes or variations.

1.8 DESIGN DRAWINGS

Prepare, organize, and present design drawings in accordance with the requirements of FC 1-300-09N, Navy and Marine Corps Design Procedures.

Submit all CAD files and Revit model for the final drawings on CD-ROM or DVD disks in software versions as determined by the Contracting Officer. Drawing files must be full files, uncompressed and unzipped.

1.8.1 Design Drawings Used as Shop Drawings

Design drawings may be prepared more like shop drawings to minimize

construction submittals after final design is approved. If the Contractor chooses or is required to include the construction submittal information on the design documents, indicate proprietary information on the design drawings as necessary to describe the products, materials, or systems that are to be used on the project. Construction submittal information included directly in the design drawings must be approved by the DOR. All design documents must be professionally signed in accordance with FC 1-300-09N, Navy and Marine Corps Design Procedures.

1.8.2 Drawing Format For Design Drawings Used as Shop Drawings

The Contractor-originated drawings will be used as the basis for the record drawings. Shop drawings included as design documents must comply with the same drawing requirements such as drawing form, sheet size, layering, lettering, and title block used in design drawings.

1.8.3 Identification of Design Drawings Used as Shop Drawings

The Contractor's transmittal letter and submittal register must indicate which design drawings are being submitted as shop drawings.

1.8.4 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.

1.8.5 Seals and Signatures on Documents

All final Contractor-originated design drawings must be signed, dated, and bear the seal of the registered architect or the registered engineer of the respective discipline in accordance with FC 1-300-09N. This seal must 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 must electronically sign and date final drawings and cover sheet, in accordance with FC 1-300-09N. The design drawing coversheets must be sealed and signed by the lead licensed architect or engineer of the project design team. Indicate the Contractor's company name and address on the drawing coversheets of each design submittal. Application of the electronic seal and signature accepts responsibility for the work shown thereon.

1.8.6 Units of Measure

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

1.9 BUILDING INFORMATION MANAGEMENT/MODELING (BIM)

Include BIM submittals as required by and complying with FC 1-300-09N:

a. BIM Project Execution Plan (PxP)

b. Design Model

c. Visual Review Report

d. Clash Detection Report

e. Record Model (With Record Documents)

1.10 SPECIFICATIONS

Provide a Contractor-originated design specification that in conjunction with the drawings, demonstrates compliance with requirements of the RFP. The specified products, materials, systems, and equipment that are approved by the DOR; submitted to the Government by the Contractor; and reviewed by the Contracting Officer must be used to construct the project. UFGS sections contained in RFP Part 2 become a part of the Contractor-originated Division 01 specification without modification. Specification Sections contained in RFP Part 5 become a part of the Contractor-originated specification without modification.

1.10.1 Specifications Components and Format

The Contractor must prepare design specifications that include a UFGS specification for each product, material, or system on the project. If the Contractor chooses or is required above to combine design and construction submittal information on the design documents, provide a UFGS specification and also proprietary information such as catalog cuts and manufacturers data that demonstrates compliance with the RFP. Organize the specifications using Construction Specification Institute (CSI) MasterFormat™ unless the Contracting Officer requires a UniFormat organization. Navy's use of system specifications takes precedence over CSI MasterFormat component breakdown and related component specifications. Provide project specifications to include the following:

a. Provide the specification cover sheet with the professional seal and signature of the lead licensed architect or engineer of the project design team. Indicate the Contractor's company name and address on the specification coversheet.

b. Table of contents for entire specification.

c. Individual UFGS specification sections for each product, material, and system required by the RFP. Edit UFGS sections in accordance with RFP Part 4, PTS Section Z-10, Design Submittals.

d. If proprietary information is provided or required, include a coversheets for the product, material, or system information that is being proprietarily specified. This information is to follow the related UFGS specification.

e. If proprietary information is provided or required, include highlighted and annotated Catalog Cuts, Manufacturer's Product Data, Tests, Certificates, Manufactures information and letters for each product, material, or system that is being proprietary specified.

f. Coordinated submittal register for all products, materials and systems with each design submittal. Provide a cumulative register that identifies the design and construction submittals required by each design package along with previous design submittals. The DOR must assist in developing the submittal register by determining which submittal items are required to be approved by the DOR. Complete all fields in the final submittal register in order to obtain Government approval of the final design. Submittal register to include separate but simultaneous delivery and approval of design or data required to fulfill sustainability requirements by Section 01 33 29 SUSTAINABILITY

REQUIREMENTS AND REPORTING.

1.10.2 Specifications Section Source Priority

Choose UFGS sections that describe the products, materials, and systems that are used on the project. Use current UFGS sections that are available on the Whole Building Design Guide website (available at this website: https://www.wbdg.org/ufgs and give priority to the Unified Tri-Service UFGS sections (no spec number suffix) and UFGS that are prepared by NAVFAC (.00 20 suffix). Only use a UFGS section prepared by another DoD Component (.00 10, and .00 30 suffix), if an applicable NAVFAC prepared specification section does not exist. Do not use Army (.00 10 suffix) specifications from Division 22 through Division 28. If no applicable UFGS technical specification exists to meet your project requirements, consult with the NAVFAC Component for guidance and create a new UFGS specification in accordance with UFS 1-300-02, Unified Facilities Guide Specifications (UFGS) Format Standard.

1.10.3 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 must be either prepared by, or reviewed and approved by the Fire Protection DOR.

1.10.4 Identification of Manufacturer's Product Data Used with Specifications

Provide complete and legible catalog cut sheets, product data, installation instructions, operation and maintenance instructions, warranty, and certifications for products and equipment for which final material and equipment choices have been made. Indicate, by prominent notation, each product that is being submitted including optional manufacturer's features, and indicate where the product data shows compliance with the RFP.

Coordinate with Section 01 78 24.00 20 FACILITY DATA WORKBOOK (FDW) for Contractor's eOMSI responsibilities.

1.10.5 Specification Software

Submit the final specification source files in SpecsIntact.

1.11 BASIS OF DESIGN

Prepare, organize, and present basis of design in accordance with the requirements of FC 1-300-09N. The basis of design must be a presentation of facts 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 or construction process. The "Permits Record of Decision" (PROD) form provided must be used for recording permits.

b. Code and criteria search must 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. Sustainability eNotebook: Maintain up-to-date documentation of analysis and calculations relative to sustainable design requirements. Refer to Section 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING and FC 1-300-09N for requirements.

e. Completed Draft and Final High Performance and Sustainable Building (HPSB) Checklist, formerly known as the NAVFAC Sustainable and Energy Data Record Card (NSEDRC). Template can be found at: https://www.wbdg.org/dod/sustainability/tracking-reporting.

f. Provide an exterior enclosure vapor pressure analysis, hygrothermal analysis, and written/graphic descriptions for each unique wall and roof assembly used as part of exterior enclosure barriers.

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

h. Fall Protection Analysis

i. Draft and Interim DD Form 1354 that document the real property assets of the project. Refer to RECORD DOCUMENTS paragraphs in this section for requirements.

j. eOMSI Facility Data Workbook (FDW)

k. BIM PxP

l. Section titled "Cybersecurity" that documents the cybersecurity design and construction of facility-related control system requirements.

1.11.1 Basis of Design Format

The basis of design for each design discipline must 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.

1.11.2 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.

1.11.3 Historic Preservation and Planning Commission Submission

Prepare the presentation materials required to obtain approval from the Historic Preservation and Planning Commissions having jurisdiction over

the site location. The submission of the materials to the agencies will be accomplished by the Government. Consult with the NAVFAC Region Historic Preservation Officer and prepare a submittal in accordance with the 36 CFR 800.11, DOCUMENT STANDARDS. The Contractor is responsible for preparing the submittal package, presenting the project in public meeting, if called upon by the Government; and to modify the submittal and contract documents to incorporate the comments of the agencies having jurisdiction to obtain project approval.

1.11.4 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 must 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.

1.11.5 Cybersecurity Basis of Design

Provide a single submittal indicating criteria and describe requirements for integrating cybersecurity in the design and construction of the facility-related control systems in accordance with UFC 4-010-06. The basis of design must describe specific guidance for control systems with the assigned Confidentiality, Integrity and Availability (C-I-A) impact ratings and shall list the security controls with recommendations and justifications for future tailoring of the security control set.

1.12 PROJECT RENDERING

Provide a full color photo-realistic architectural rendering of the primary facade or facades of the facility. Depict the final, approved facility design and accurately illustrate the proposed final constructed facility including but not limited to, massing, fenestration pattern, material selections, colors, textures, landscaping, paving, and to the extent directed - the surrounding context.

Renderings created using traditional casein painted techniques or computer generated renderings are acceptable. Develop computer generated renderings using a current rendering engine suitable to produce photo-realistic images. Renderings created solely in BIM or CAD authoring software are not acceptable.

Renderings must include realistic advanced lighting characteristics (natural and synthetic) and true ambient lighting and shading characteristics. Provide images that are sharp in detail and resolution through proper anti-aliasing techniques. Material maps must be comprised of advanced techniques and practices to ensure materials are an exact representation of the facility product/finish selections.

1.12.1 Prefinal Rendering

Submit the prefinal rendering to indicate compliance with planning decisions, establish level of detail and rendering elements to be employed such as people, cars, vegetation/trees. Indicate proposed colors, textures, foreground and background. Use processes and printing equipment that will be used on the final rendering. Submit Prefinal rendering

submittal for approval with the Prefinal Design Submittal.

1.12.2 Final Rendering

Provide the final rendering submission that complies with the following requirements:

a. The rendering must be a full vignette and fully developed. Approximate finished size must be a minimum of 24 by 30 inches with a 16 by 20 inches minimum inside mat dimension.

b. Provide final original color rendering, two full size high resolution reproductions of the original rendering, and two sets of the digital master images on DVD media. Original and reproductions must be mounted on acid free heavy illustration board and double-matted with complimentary colored, acid free mat boards. Frame rendering(s) with contemporary polished metal frames and single strength, non-glare glass. Print the Project name, location, Architect/Engineer firm's name on the matting. On the back of the renderings and reproductions, indicated the project name, the location, the contract number, and the date of reproduction.

c. Match the exterior color scheme approved for the facility.

d. Provide photo-realistic quality rendering elements such as people, cars, vegetation/trees, and so forth.

e. Provide digitally reproductions of the rendering using a minimum 600 dpi resolution for print reproduction on 24 by 36 inch stock with no loss of fidelity, quality or detail from the master image.

f. Provide each set of digital master images in both TIF and JPEG formats. Save JPEG images using the highest quality setting (minimum compression). Provide the following as a minimum;

   (1) One set including the unit insignia(s) for the tenant activity, the service insignia (Navy, Marine Corps, Army, or Air Force), the name of the facility, name of installation, and the names of the contractor and design professional.

   (2) One set including the image only, without any identifying information other than that which may be depicted as a part of the building signage within the rendering.

g. Submit the final rendering for approval 30 days after the Final Design Submittal approval. Ship the rendering, the digital copies and the digital files in resilient packaging to ensure damage free delivery.

1.13 RECORD DOCUMENTS

1.13.1 Record Drawings

The as-built modifications must be accomplished by electronic drafting methods on the Contractor-originated DWG design drawings to create a complete set of record drawings. In addition to the requirements of FAC 5252.236-9310, RECORD DRAWINGS, survey the horizontal and vertical location of all provided underground utilities to within 0.1 feet relative to the station datum. All pipe utilities must be surveyed at each fitting and every 100 LF of run length. Electrical and communication duct bank,

direct buried conduit, and direct buried conductor must be surveyed every 100 LF and at each change of direction. Record locations and elevations on the Record Drawings.

a. For each record drawing, provide CAD drawing identical to signed Contractor-originated PDF drawing, 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 CAD.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 CAD.DWG files, produce a PDF and .TIF file of each individual record drawing in conformance with FC 1-300-09N. Electronic signatures are not required on record drawings.

c. Provide a searchable electronic copy of the photo documentation used in the QC Daily Reports. Refer to Section 01 45 00 QUALITY CONTROL.

1.13.2 Source Documents

Provide the specifications, basis of design, reports, surveys, record model, calculations, and any other contracted documents on the CD-ROM or DVD disk with the record drawings.

1.13.3 DD Form 1354

Prepare a Draft and Interim DD Form 1354, TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY, in accordance with UFC 1-300-08. Coordinate the identification of quantities of appropriate asset construction categories with the Contracting Officer and the RPAO.

a. The Government will provide the Initial Draft DD Form 1354, Transfer and Acceptance of Military Real Property filled in with the appropriate Real Property Unique Identifiers (RPUID) and related construction Category Codes to summarize the designed real property assets that apply to this contract. Modify and include any necessary changes to the DD Form 1354 when meeting with the Contracting Officer and the Real Property Accounting Officer during the Pre Construction Meeting and the Project Closeout Meetings. The Contractor must provide the Interim DD Form 1354 that uses the appropriate division of the RPUIDs/ Category Codes to represent the final constructed facility and include all associated cost.

(1) Coordinate the Contractor's Price and Payment structure with the structure of the RPUIDs/ Category Codes.

(2) Divide detailed asset breakdown into the RPUIDs and related construction Category Codes and populate associated costs which represent all aspects of the work. Where assets diverge into multiple RPUID/Category Codes, divide the asset and provide the proportion of the assets in each RPUID/ Category Code. Assets and related RPUID/ Category Codes may be modified by the Contracting Officer as necessary during course of the work.

(3) Coordinate identification and proportion of these assets with the Government Real Property Accounting Officer.

(4) Cost data accumulated under this section are required in the

preparation of DD Form 1354.

b. After award of the contract but prior to commencement of any work, meet with the Contracting Officer to discuss and develop a clear understanding relative to the administration of the Draft and Interim DD Form 1354 Submittal.

c. Draft DD Form 1354. DOR must determine quantities of applicable real property assets broken out by construction categories and submit a "Draft DD Form 1354" for Government approval as a part of the Basis of Design included with the Prefinal Design submittal. "Draft DD Form 1354" must include all quantities and units of measure, but does not require cost breakdown. The Real Property Accountable Officer (RPAO) will provide the first draft of the DD1354 to the contractor with RPUIDs and CCNS on it.

d. Interim DD Form 1354. Coordinate with the DOR and update the Draft DD Form 1354 submission to include any additional assets, improvements, or alterations that occurred during construction. Use the Draft DD Form 1354 and the Section 01 20 00 PRICE AND PAYMENT PROCEDURES to identify costs. Submit Interim DD Form 1354 to the Government for approval 30 days prior to the Beneficial Occupancy Date (BOD). Attach completed NAVFAC High Performance and Sustainable Building (HPSB) Checklist to DD1354, in accordance with Section 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING. If modifications to the Interim DD Form 1354 are required by the Government, the corrected version must be submitted prior to the BOD.

Submit the completed Checklist for Form DD1354 of Government-Furnished and Contractor-Furnished/Contractor Installed items. Attach this list to the Interim DD Form 1354. Instructions for completing the form and a blank checklist may be obtained from UFC 1-300-08.

Coordinate with Section 01 20 00 PRICE AND PAYMENT PROCEDURES for construction categories and associated category codes. The Contractor's Schedule of Prices must allocate the total cost of construction to the appropriate category codes.

When documenting demolition work, the DD Form 1354 must 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.

There are two ways to account for the demolition portion of the project and to document the reduction of real property: (1) attach an Authorization for Demolition form 18 (Service-specific) to the DD Form 1354 to document category codes and quantities of demolished real property. These should be listed separately from constructed/transferred item numbers; or, (2) indicate, as additional DD Form 1354 item numbers, all demolished real property facility numbers and category codes using negative numbers (shown in parenthesis) for units of measure, and in block 18 indicate N/A for costs. Disposal cost within the footprint of the project is added into total construction cost of new facility prompting the demolition.

1.14 REQUEST FOR INFORMATION

Submit copies of all completed Request for Information (RFI)

correspondences to the Contracting Officer within 5 working days of the RFI completion.

PART 2 PRODUCTS

2.1 CONSOLIDATED RFP DOCUMENTS

Within four weeks after contract award, provide three electronic and hard copies of 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.

2.2 DESIGN SUBMITTALS

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

Refer to Section 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING for sustainable design submittals.

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 Critical Path Design Submittals are acceptable if they are substantiated as having an impact to the critical path in the Government approved Network Analysis Schedule. A Critical Path submittal must include all design analyses, drawings, specifications and product data required to fully describe the project element for Government review.

Examples of project elements that may be submitted as Critical Path Design Submittal Packages are: Master Plan Design, Demolition Design, Foundation Design, Structural Design, Building Enclosure Design, Remaining Work Design, Furniture/Equipment Design, long lead items, or any other construction activity or project element that can be organized into a submittal package that can be reviewed and approved by the Government without being contingent upon subsequent design submittals.

2.2.1.1 Site Design

The Site Design typically includes the following components:

a. Demolition

b. Site work including Environmental

c. Geotechnical

2.2.1.2 Building Design

The Building Design typically includes the following components:

a. Foundation

b. Structural

c. Building Enclosures

d. Remaining Work

e. Furniture/Equipment

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 FC 1-300-09N, except where specified otherwise.

a. Design Development in-progress - Government Progress QA. 21 calendar day Government review time.

b. Prefinal (100 percent) Design - Government Progress QA. 21 calendar day Government review time.

c. Final Design - Government QA. 21 calendar day Government review time for submittals requiring Government approval prior to construction.

2.2.3 Critical Path Design Submittals

Provide Critical Path Design Submittals that include design documents for the project elements involved. Include and provide full documentation that would normally have been provided in earlier submittal stages, such as Design Development Phase.

a. 100 percent (Prefinal) Design - Government Progress QA. 21 calendar day Government review time.

b. Final Design - Government QA. 21 calendar day Government review time for submittals requiring Government approval prior to construction.

2.2.4 Review Copies of Design Submittal Packages

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

(1) 8 paper copies to the NAVFAC component and 1 electronic copies of the Final submittals.

(2) 2 paper copies to the Activity.

(3) 8 paper copies to the Activity Public Works Officer (PWO) and 1 electronic copy of the Final submittals.

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

2.2.5 Design Submittal Review Schedule

Use the time frames for Government submittal review identified in the RFP. For construction scheduling purposes add additional time to the

identified minimum review time periods to allow for the following scheduling conditions:

(1) Submittals received after noon will be logged in on the following business day.

(2) Federal holidays, including the period between Christmas and New Year's Day, will be considered non-working days for Government personnel in reviewing design submittals and attending design related meetings.

(3) Postpone delivery if Government personnel to receive the submittal are unavailable. Assure in advance of the submittal delivery it can be received.

(4) Postpone delivery when heightened security restricts access to the Base. Coordinate heightened security requirements in advance with the CM.

(5) Period of review for a resubmittal is the same as the initial submittal. Review time for resubmittals caused by non-conformance, do not result in a change in contract duration or cost.

2.2.6 Distribution of Approved Final Design Drawings and Specification to Government Representatives

Submit within 14 calendar days of receiving the Government Approved Final Design Documents, which includes any Critical Path Final Design Document Packages, electronic and hardcopy(s) of these final documents to Government representatives for use during the construction of the project. If Critical Path Submittal Packages are used, provide coversheets and index to identify each sheet and how this Critical Path Submittal Package fits into the overall project. Provide the number and type of copies of the final design documents to the following Government representative:

a. Two electronic copy(s) to the Project Manager (name, address, and phone number)

b. Two electronic copy(s) to the Design Manager

c. One electronic copy to the Construction Manager

d. One electronic and one hard copy to the Contracting Officer

e. One electronic and one hard copy to the Public Works Officer

2.3 IDENTIFICATION OF DESIGN SUBMITTALS

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

2.3.1 Critical Path Submittal Title Sheet

Identify Critical Path submittals as such and include a title sheet

indicating the type of critical path submittal, the level of completion of the individual drawings, and which drawings are approved for construction.

2.3.2 Construction Document Validation

All CAD design documents used to construct the facility must bear a visible and legible AutoCAD generated plotstamp in the lower right-hand margin of each drawing. The plotstamp information on the jobsite construction documents must match the plotstamp information contained on the following development stages of the design documents:

a. The Final Critical Path Submittal or the Final Design Submittal professionally signed by the DOR and submitted for Government approval.

b. The Final Critical Path Submittal or the Final Design Submittal drawings that have been approved by the Government. This development stage may be combined with "c." below, if issued at the same time.

c. The Final Critical Path or Final Design drawings that have been included in the contract by modification.

d. The Final Critical Path or Final Design drawings which include subsequent revisions to the design documents that have been included in the contract by modifications.

Issue new drawings for construction which bear the current plotstamp once a new development stage of the design documents has been accomplished. Design documents which do not bear a plotstamp that matches the corresponding plotstamp exhibited on the design documents described above, are not allowed to be used for the construction of the project. The plotstamp must bear the date and time of the plot, at a minimum. Maintain a plotstamp record at the jobsite that lists the applicable plotstamp information for each drawing through each stage of development described above.

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 must be a complete package that includes all the required, specified components of that design submittal. When required by the Government, Contractor resubmittal of design package, due to nonconformance to the contract, is not a delay in the contract.

3.2 DESIGN CHANGE AND VARIATIONS

A design change is when the design is revised from what was reviewed by the Government during any phase of the design process prior to Government approval of the Final Design. A variation is any portion of the design that differs from the requirements of the solicitation, accepted proposal, or final design after Government approval of the Final Design. Design changes and variations require Government approval and only variations that are advantageous to the Government will be considered. Refer to Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES for further explanation and requirements of design change and variation.

The Contractor must immediately notify the Government of all potential

design changes and variations via a Request for Information (RFI) which must be clearly marked as "DESIGN CHANGE" or "VARIATION" to the Contracting Officer. Design changes or variations that the Contractor asserts will require a contract modification to adjust the cost/price or schedule are not allowed to be incorporated in the design during any phase of the design process without prior documented approval from the Contracting Officer. Contractors will not receive compensation for any unauthorized design changes or variations which have been included in the Government approved Final Design. Include the following information in the design change and variation RFIs:

a. Indicate the RFP Parts, sections, and paragraphs affected by this design change or variation,

b. The scope of work of the design change or variation,

c. The reason for the proposed change,

d. Explanations of how the variation is advantageous to the Government.

e. Indicate which upcoming design submittal will be affected by the subject design change,

f. Explanation of contract cost/price and schedule impacts or provide an affirmative statement indicating that the design change or variation will not have an impact on the contract cost/price or schedule.

g. Coordination measures proposed to incorporate the design change or variation into the construction.

h. Upon request by the Contracting Officer, submit a cost proposal prepared using the UniFormat Work Breakdown Structure for all design changes and variations that have cost or schedule impacts. Submit a proposal that provides cost breakdown of each UniFormat system or subsystem that is applicable to the design change or variation. Utilize the units of measure indicated in the UniFormat Structure at the NAVFAC DB RFP website, https://www.wbdg.org/navy/ndbm.

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

In the event of conflict or inconsistency between any of the below described portions of the conformed contract, precedence must 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 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).

c. Within Part 3 - Project Program Requirements Section 5.0 ROOM REQUIREMENTS provides detailed requirements on a room by room basis that further defines requirements that are in addition to the ENGINEERING SYSTEMS REQUIREMENTS SECTION.

3.3.2.1 Government Review or Approval

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

-- End of Section --

SECTION 01 33 29

SUSTAINABILITY REQUIREMENTS AND REPORTING
02/21, CHG 1: 08/25

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. For references without a year, use the current published version.

COUNCIL ON ENVIRONMENTAL QUALITY (CEQ) (WHITE HOUSE)

HPSB Guiding Principles	Guiding Principles for Sustainable Federal Buildings and Determining Compliance with the Guiding Principles for Sustainable Federal Buildings

GREEN BUILDING INITIATIVE (GBI)

GBI DOD GP Compliance	GBI Department of Defense Guiding Principles Compliance Program for New Construction

INTERNATIONAL CODE COUNCIL (ICC)

ICC IgCC	(2018) International Green Construction Code

U.S. DEPARTMENT OF AGRICULTURE (USDA)

FSRIA 9002	Farm Security and Rural Investment Act Section 9002 (USDA BioPreferred Program)

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 1-200-02	(2020; Change 3, 2025) High Performance and Sustainable Building Requirements
UFC 3-410-01	(2013; with Change 9, 2024) Heating, Ventilating, and Air Conditioning Systems
UFC 3-600-01	(2016; with Change 6, 2021) Fire Protection Engineering for Facilities

U.S. DEPARTMENT OF ENERGY (DOE)

Energy Star	Energy Star Energy Efficiency Labeling System (FEMP)
FEMP	Federal Energy Management Program (FEMP) Energy-Efficient Product Procurement

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

10 CFR 433.300	Subpart C - Green Building Certification for Federal Buildings
40 CFR 247	Comprehensive Procurement Guideline for Products Containing Recovered Materials

1.2 SUMMARY

This section includes requirements for Sustainability documentation and reporting submittals per the federally mandated High Performance and Sustainable Building (HPSB) or HPSB "Guiding Principles" (GP), and Third-Party Certification (TPC) requirements, in accordance with UFC 1-200-02 High Performance and Sustainable Building Requirements, and other identified requirements.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and Section 01 33 10.05.20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Preliminary High Performance and Sustainable Building Checklist; G, S

Sustainability Action Plan; G, S

Preliminary Sustainability eNotebook; G, S

SD-05 Design Data

Interim Design High Performance and Sustainable Building Checklist; G, S

Interim Design Sustainability eNotebook; G, S

Final Design High Performance and Sustainable Building Checklist; G, S

Final Design Sustainability eNotebook; G, S

SD-06 Test Reports

Third-Party Certification Design Compliance Report; G, S

SD-11 Closeout Submittals

Final High Performance and Sustainable Building Checklist; G, S

Final Sustainability eNotebook; G, S

Amended Final Sustainability eNotebook; G, S

Amended Final High Performance and Sustainable Building Checklist;

G, S

Third-Party Certification Certificate, Assessment, or Validation and Compliance Report; G, S

1.4 GUIDING PRINCIPLES VALIDATION (GPV)

Guiding Principles Validation (GPV) is the project delivery team's self-assessment of UFC 1-200-02 compliance requirements, which includes meeting Federally-required tracking and reporting requirements, in order to report a sustainable Federal building. The use of a third-party certification is an additional and separate requirement.

Provide the following sustainability activities and documentation to verify achievement of HPSB Guiding Principles Validation (GPV):

a. Analysis of each Guiding Principle Requirement and how project complies. Include final government approved narrative(s) in the HPSB Checklist submittal. Multiple checklists indicate multiple buildings that require individual HPSB Checklist tracking.

b. No changes to the HPSB Checklist are allowed without approval from the Contracting Officer, in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES, paragraph DESIGN CHANGE AND VARIATION. Immediately bring to the attention of the Contracting Officer any project changes that impact meeting the approved HPSB Guiding Principles Requirements for this project. Demonstrate the change will not increase the life-cycle cost and maintains or improves the building performance.

c. Documentation of all work required to incorporate the applicable HPSB Guiding Principles requirements indicated on the HPSB Checklist and in this contract, including all "S" submittals.

d. Sustainability Action Plan.

e. Design and construction related documentation for the project Sustainability eNotebook and keep updated with regularly-scheduled Construction Quality Control Meetings. Include design and construction related documentation containing the following components:

(1) HPSB Checklist(s)

(2) Sustainability Action Plan

(3) Documentation illustrating HPSB Guiding Principles Requirements compliance, including "S" submittals

1.4.1 Sustainability Action Plan

Include the following information in the Sustainability Action Plan:

a. Analysis of each HPSB Guiding Principles Requirement and how project will comply. Final government approved narrative(s) must be included in the HPSB Checklist submittal.

b. Name and contact information for: Contractor's Point of Contact (POC) ensuring sustainability goals are accomplished and documentation is

assembled. For TPC that include on-site visit by third party representative, provide list of required attendees.

c. Indoor Air Quality plan.

1.4.2 Calculations

Provide all design data, calculations, product data, labels and product certifications required in this specification to demonstrate compliance with the HPSB Guiding Principles Requirements.

1.5 SUSTAINABILITY SUBMITTALS

Provide HPSB Checklist and other documentation in the Sustainability eNotebook to indicate compliance with the sustainability requirements of the project.

1.5.1 High Performance Sustainable Building (HPSB) Checklist

Provide construction documentation that provides proof of, and supports compliance with, the completed HPSB Checklist.

1.5.1.1 HPSB Checklist Submittals

Submit updated HPSB Checklist with each Sustainability eNotebook submittal. Include the final HPSB Checklist(s) with the interim DD1354 Real Property Record Submittal.

1.5.2 "S" Submittals for Sustainability Documentation

"S" submittals are the sustainability documentation requirements cited in the various sections of this contract. Submit the GPV and TPC sustainability documentation required in this section as "S" submittals in all affected UFGS Sections.

a. Highlight GPV and TPC compliance data in "S" submittal.

b. Add "S" submittals to the Sustainability eNotebook only after submittal approval, and bookmark them as required in paragraph SUSTAINABILITY ENOTEBOOK below.

c. Ensure all approved "S" submittals are included in each Sustainability eNotebook submittal.

1.5.3 Sustainability eNotebook

The Sustainability eNotebook is an electronic organizational file that serves as a repository for all required sustainability submittals. To support documentation of compliance with an approved HPSB and TPC checklist, provide and maintain a comprehensive and current Sustainability eNotebook. Include all required data in Sustainability eNotebook, to support full compliance with the HPSB Guiding Principles Requirements, including:

a. HPSB checklist

b. Sustainability Action Plan

c. Calculations

d. Labels

e. "S" submittals

f. Certifications, assessments, or validations and compliance report

g. TPC documentation required in paragraph THIRD-PARTY CERTIFICATION (TPC).

1.5.3.1 Sustainability eNotebook Format

Provide Sustainability eNotebook in the form of an Adobe PDF file; bookmark each HPSB Guiding Principles Requirement, and each TPC requirement, and sub-bookmark at each document. Match format to HPSB Guiding Principles numbering system indicated herein. Maintain up-to-date information, such as spreadsheets, templates, with each current submittals. For TPC projects, provide a second Table of Contents using TPC numbering system, for maintaining documentation unique to TPC.

Contracting Officer may deduct from the monthly progress payment accordingly if Sustainability eNotebook information is not current and on track per project goals.

1.5.3.2 Sustainability eNotebook Submittal Schedule

Provide Sustainability eNotebook Submittals at the following milestones of the project:

a. Preliminary Sustainability eNotebook

b. Submit preliminary Sustainability eNotebook with updated Preliminary High Performance and Sustainable Building Checklist and TPC checklist at the first post award meeting in accordance with Section 01 30 00 ADMINISTRATIVE REQUIREMENTS.

c. Interim Design Sustainability eNotebook

d. Submit updated Sustainability eNotebook with updated Interim Design High Performance and Sustainable Building Checklist with TPC Checklist with each design submittal, in accordance with Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES. If issues relating to achieving the sustainability goals of the project are subsequently identified, identify reasons and mitigation from DOR, and resubmit to the Contracting Officer for approval.

e. Final Design Sustainability eNotebook

f. Submit updated Sustainability eNotebook with updated Final Design High Performance and Sustainable Building Checklist with TPC Checklist with the final design, in accordance with Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES. If issues relating to achieving the sustainability goals of the project are subsequently identified, identify reasons and mitigation from DOR, and resubmit to the Contracting Officer for approval.

g. Third-Party Certification Design Compliance Report

h. Obtain Third-Party Certification Design Compliance Report after final

design submittal is approved. Submittal must indicate 100 percent compliance with applicable design requirements. File approved submittal in the Sustainability eNotebook.

i. Construction Quality Control Meetings.

j. Provide up-to-date GP and TPC documentation in the Sustainability eNotebook and TPC Online tool for each meeting.

k. Final Sustainability eNotebook

l. Submit updated Sustainability eNotebook with updated Final High Performance and Sustainable Building Checklist with TPC Checklist, in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES at Beneficial Occupancy Date (BOD). Final progress payment retainage may be held by Contracting Officer until Final Sustainability construction phase documentation is complete.

m. Amended Final Sustainability eNotebook

n. Amend and resubmit the Amended Final Sustainability eNotebook with Amended Final High Performance and Sustainable Building Checklist and amended TPC Checklist, to include post-occupancy corrections, updates, and requirements. Final progress payment retainage may be held by Contracting Officer until amended final sustainability documentation is complete. Submit electronic copy of the Amended Final Sustainability eNotebook Submittal to the Contracting Officer no later than 30 days after final GP, TPC determination.

1.6 DOCUMENTATION REQUIREMENTS

a. Incorporate each of the following HPSB Guiding Principles requirements into project and provide documentation that proves compliance with each listed requirement. Items below are organized by HPSB Guiding Principles. For life-cycle cost analysis requirements, one document with all analyses is acceptable, with Contracting Officer approval.

b. For each of the following paragraphs that require the use of products listed on Government-required websites, provide documentation of the process used to select products, or process used to determine why listed products do not meet project performance requirements.

1.6.1 Integrated Design Process

For the submittal documentation below, demonstrate compliance with UFC 1-200-02.

1.6.1.1 Design Submittal Documentation

a. List the sustainability integrated design team, and a description of their roles in all stages of a project's planning and delivery:

(1) Include Contractor's Sustainability Coordinators; Architecture and Engineering disciplines involved on the project, and the DOR in charge of the overall project and each discipline; Construction Subcontractors and the company representatives that align with each architectural and engineering discipline, Planning, Public Works, Environmental Specialist and other

appropriate installation personnel.

(2) Describe their roles and responsibilities and plan-of-action for how each team member will be involved to achieve the project sustainability requirements, and how the Contractor will coordinate with Government personnel.

(3) Maintain an up-to-date list with descriptions throughout the project.

b. Provide narratives that:

(1) Indicate each performance goal cited in UFC 1-200-02 paragraph "Integrated Design Process", along with other comprehensive design goals and ensures incorporation and integration of these goals throughout the planning, design, construction, and life cycle of the building..

(2) Demonstrate integration of the goals into design and construction.

(3) Demonstrate collaboration with other providers, such as Commissioning Provider.

1.6.2 Commissioning (Cx)

Develop and incorporate Commissioning requirements into the documents, and provide final commissioning report. Refer to Section 01 91 00.15 BUILDING COMMISSIONING and related documents for commissioning requirements.

1.6.3 Optimize Energy Performance

For the submittal documentation below, demonstrate compliance with UFC 1-200-02.

1.6.3.1 Design Submittal Documentation

a. Narrative that provides a summary of:

(1) The decision-making process for considering and implementing passive strategies prior to designing active and mechanical systems.

(2) The decision-making process leading to the selection of at least three energy-efficient solutions (for each system contributing to the energy footprint of the building) to be analyzed; and the selected design solution(s)

(3) The specific energy standard and version utilized; and the software used in the analysis

(4) The calculated energy consumption and energy use intensity (EUI in kBTU/sf/yr) of the baseline building and the proposed design alternatives

b. A minimum of the following energy modeling files and summaries for the baseline and proposed alternatives:

(1) Input, schedules and libraries; and output

(2) Calculated energy use by energy type

(3) Calculated energy use by building system

c. The life-cycle cost analysis input and output files for the baseline and the proposed alternatives

1.6.3.2 Construction Submittal Documentation

Provide revised energy modeling for actual system constructed.

1.6.4 Energy Efficient Products

Provide only energy-using products that are Energy Star Certified by the Environmental Protection Agency (EPA) or that meet or exceed the efficiency standard designated by the Federal Energy Management Program (FEMP). Where Energy Star or FEMP requirements have not been established, provide most efficient products that are life-cycle cost-effective. Provide only energy using products that meet FEMP requirements for low standby power consumption. Energy efficient products can be found at: https://www.energystar.gov/.

For construction submittal documentation, provide proof that product is labeled energy efficient and complies with the cited requirements.

1.6.5 On-Site Renewable Energy Generation

For the submittal documentation below, demonstrate compliance with UFC 1-200-02.

1.6.5.1 Design Submittal Documentation

Provide life-cycle cost analysis (LCCA). When found to be LCCE, do one of the following options:

a. Provide design drawings and calculations that demonstrate total on-site renewable energy as an annual percentage of proposed building energy consumption in kBTU/year; and provide equipment ratings, and calculations that demonstrate the generation capacity of the system in kBTU/year for thermal and kwh for electricity.

b. Provide documentation that renewable energy development at the Installation level is planned.

1.6.6 Solar Domestic Hot Water (SDHW)

For the submittal documentation below, demonstrate compliance with UFC 1-200-02.

1.6.6.1 Design Submittal Documentation

Provide life-cycle cost analysis (LCCA). When found to be LCCE, provide design drawings and calculations that demonstrate total on-site renewable energy as an annual percentage of proposed building energy consumption in kBTU/year; and provide equipment ratings, and calculations that demonstrate the generation capacity of the system in kBTU/year for thermal.

1.6.7 Building-level Power Metering

Provide building-level meters for electricity, natural gas, and steam where applicable.

1.6.7.1 Design Submittal Documentation

Provide design drawings that highlight meter locations on the site.

1.6.7.2 Construction Submittal Documentation

Provide documentation of meter communication with the base-wide meter monitoring system, and manufacturer's data validating compatibility with base-wide system and component advanced meter requirements.

1.6.8 Indoor Water Use

Provide Construction Documentation proof that fixtures are labeled EPA WaterSense, for products available with EPA WaterSense labeling; for all other fixtures, proof they comply with EPA WaterSense efficiency requirements.

1.6.9 Indoor Water Metering

Provide building-level meters for potable water use. Provide the requirements cited in the following paragraphs:

1.6.9.1 Design Submittal Documentation

Provide design drawings that highlight meter locations on the site.

1.6.9.2 Construction Submittal Documentation

Provide documentation of meter communication with the base-wide meter monitoring system, and manufacturer's data validating compatibility with base-wide system and component advanced meter requirements.

1.6.10 Outdoor Water Use

When there is no permanent irrigation system beyond plant establishment period, this element is met.

1.6.11 Outdoor Water Meters

Provide meters for outdoor systems that use potable water. Provide the requirements cited in the following paragraphs:

1.6.11.1 Design Submittal Documentation

a. Provide design drawings that highlight meter locations on the site.

b. Provide life-cycle cost analysis (LCCA).

1.6.11.2 Construction Submittal Documentation

Provide documentation of meter communication with the base-wide meter monitoring system, and manufacturer's data validating compatibility with base-wide system and component advanced meter requirements.

1.6.12 Alternative Water

Use alternative sources of water to replace potable water usage, when life-cycle cost-effective and to the extent permitted by local laws and regulations.

1.6.12.1 Design Submittal Documentation

a. Provide design drawings and calculations that demonstrate the alternative water sources used, potable water savings as compared to non-alternative water sourcing, and projected annual potable water savings.

b. Provide life-cycle cost analysis (LCCA).

1.6.13 Stormwater Management

Develop and incorporate stormwater requirements into the documents. Service processes, as proof of this tracking requirement.

1.6.14 Ventilation and Thermal Comfort

For the submittal documentation below, demonstrate compliance with UFC 1-200-02 and UFC 3-410-01.

1.6.14.1 Design Submittal Documentation

Provide design drawings and calculations that demonstrate HVAC systems and the building envelope have been designed to meet the requirements.

1.6.15 Daylighting

For the submittal documentation below, demonstrate compliance with UFC 1-200-02.

1.6.15.1 Design Submittal Documentation

a. Provide floor plans and elevations that demonstrates all required illumination levels, including automated and daylighting controls, and daylighting where people regularly occupy and gather.

1.6.16 Moisture Control

Provide the following:

1.6.16.1 Design Submittal Documentation

Provide drawings of building envelope details, HVAC humidity controls, and design calculations..

1.6.16.2 Construction Submittal Documentation

Ensure construction materials are separated and protected in accordance with other sections in this contract document, with adequate humidity controls during construction. In accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA, includes plan for ongoing building moisture control.

1.6.17 Reduce Volatile Organic Compounds (VOC) (Low-Emitting Materials)

Meet the requirements of Table 3-1 at the end of this specification.

For Construction submittal documentation, provide certifications or labels that demonstrate compliance with cited requirements, based on the attached TABLE 3-1.

1.6.18 Indoor Air Quality During Construction

Prior to construction, create indoor air quality plan. Develop and implement an IAQ construction management plan during construction and flush building air before occupancy.

For new construction and for renovation of unoccupied existing buildings, meet the requirements of ICC IgCC 1001.3.1.5 (10.3.1.5) Indoor Air Quality (IAQ) Construction Management. Coordinate with moisture control requirements in Section 01 45 00 QUALITY CONTROL.

Provide documentation showing that after construction ends and prior to occupancy, HVAC filters were replaced and building air was flushed out in accordance with the cited standard.

1.6.19 Recycled Content

Comply with 40 CFR 247. Refer to: https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program for assistance identifying products cited in 40 CFR 247. Selected products must comply with non-proprietary requirements of the Federal Acquisition Regulation and must meet performance requirements.

1.6.19.1 Construction Submittal Documentation

a. Provide manufacturers' documents stating the recycled content by material, or written justification for claiming one of the exceptions allowed on the cited website.

b. Substitutions: Submit for Government approval for proposed alternative products or systems that provide equivalent performance and appearance and have greater contribution to project recycled content requirements. For all such proposed substitutions, submit with the Sustainability Action Plan accompanied by product data demonstrating equivalence.

c. In order to complete compliance with FAR 52.223-9 Estimate of Percentage of Recovered Material Content for EPA Designated Items, refer to submittal requirement for recycled/recovered material content in Section 01 78 00 CLOSEOUT SUBMITTALS.

1.6.20 Bio-Based Products

Provide products and materials composed of the highest percentage of bio-based materials (including rapidly renewable resources and certified sustainably harvested products), consistent with FSRIA 9002 USDA BioPreferred Program, to the maximum extent possible without jeopardizing the intended end use or detracting from the overall quality delivered to the end user and when available at a reasonable cost. Use only supplies and materials of a type and quality that conform to applicable specifications and standards.

Comply with FSRIA 9002 USDA BioPreferred Program. Refer to www.biopreferred.gov for the product categories and BioPreferred Catalog. Selected products must comply with non-proprietary requirements of the Federal Acquisition Regulation and must meet performance requirements. Provide the following documentation:

a. USDA BioPreferred label for each product; for bio-based products used on project but not listed with BioPreferred program, provide bio-based content and percentage.

b. In order to complete compliance with FAR 52.223-1 Biobased Product Certification, refer to submittal requirement for biobased products in Section 01 78 00 CLOSEOUT SUBMITTALS, paragraphs CERTIFICATION OF EPA DESIGNATED ITEMS and CERTIFICATION OF USDA DESIGNATED ITEMS.

1.6.21 Waste Material Management (Recycling – Design)

For the submittal documentation below, demonstrate compliance with UFC 1-200-02.

For design submittal documentation, provide drawing showing an appropriately sized and placed dedicated storage area for recyclables.

1.6.22 Waste Material Management (Recycling – Construction)

Divert demolition and construction debris in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

1.6.23 Address Risk

For design submittal documentation, provide narrative of decisions for design associated with scoped requirements.

1.6.24 Additional Sustainability Requirements

Provide the additional sustainability requirements cited in this paragraph.

1.6.24.1 Third-Party Certification (TPC) Documentation

Third-Party Certification certificate, assessment, or validation, and compliance report requirements are in addition to all requirements under header above GUIDING PRINCIPLES VALIDATION (GPV).

1.6.24.1.1 TPC Registration

Achieve Third-Party Certification (TPC), by meeting all TPC and project requirements to achieve GBI DOD GP Compliance, or Government-approved equivalent TPC sustainability certification, assessment, or validation. An equivalent TPC organization must demonstrate equivalency for Government consideration and meet the requirements of 10 CFR 433.300, prior to use on the project. Third-Party Certification is met when Government receives TPC organization certificate, assessment, or validation and compliance report.

The project has been registered with GBI (Project ID: #105615).

1.6.24.1.2 TPC Management and Certification

Execute the following TPC Certification, assessment, or validation requirements:

a. Refer to TPC Checklist at the end of this specification section. (Multiple checklists indicate multiple buildings that require TPC.)

b. Immediately bring to the attention of the Contracting Officer any project changes that impact meeting the approved TPC Requirements for this project. Demonstrate the change will not increase the life-cycle cost and maintains or improves the building performance.

c. Complete all design and construction work to incorporate the applicable TPC Requirements.

d. Maintain the design and construction related information in the Sustainability eNotebook pertaining to additions and changes to the approved sustainability requirements. Maintain the Sustainability eNotebook in electronic format. Refer to explanation in the paragraph SUSTAINABILITY eNOTEBOOK. Provide the following components in the Sustainability eNotebook, in addition to the GPV components listed above:

(1) TPC Checklist

(2) Completed TPC forms. Transmit by the method required by TPC organization.

(3) Copy of all correspondence with the TPC organization. Provide proof of TPC registration.

(4) Documentation illustrating compliance with TPC requirements and additional documentation as requested by the Third Party certifier.

(5) TPC Award Certificate, assessment or validation and compliance report.

e. Provide the following information in the Sustainability Action Plan. Provide this TPC information in addition to the Sustainability Action Plan items above:

(1) Planned method to achieve each TPC requirement.

(2) Provide analysis of each TPC credit and how project will comply.

(3) Provide names and contact information for: Contractor sustainability point of contact (POC) and other names of sustainability professionals on the Contractor's Staff responsible for ensuring TPC sustainability goals are accomplished and documentation is assembled. It is recommended the construction team has a member with a current TPC credential, when available, that matches the TPC system and variation specialty pursued for the certification. When retained, this team member must be engaged and keep this credential current over the duration of the entire project schedule.

(4) TPC vendor's project identification and number.

f. Bear all costs associated with designing, constructing, demonstrating, and documenting that project complies with approved TPC requirements, including but not limited to:

(1) Registration, review, certification, assessment, or validation fees.

(2) Online (or offline with secure facilities) TPC management and documentation.

(3) Obtaining TPC certification, assessment, or validation based on Government-approved sustainability goals.

(4) Design and construction work required to incorporate TPC requirements.

(5) Submittals required to demonstrate compliance with Government approved TPC checklists.

g. Provide all design data, calculations, product data, and certifications, assessments, or validations required in this specification to demonstrate compliance with the TPC Requirements.

h. Provide all online (or offline, with secure facilities) TPC management and documentation.

i. Provide all required responses to third party organization.

j. Provide TPC Certificate, assessment, or validation. Provide TPC compliance report that includes level achieved and reasons for non-compliance or not applicable elements. Use the following format to create the Plaque, Certificate, assessment, or validation, compliance report, and Letter of Congratulations. Forward to parties designated by Contracting Officer:

(1) Certificate, Assessment, or Validation:

(2) Project title, first line: P-(X); (1391 Project Name). Project title, second line: UIC (installation code)

(3) Letter of Congratulation (when provided):

(4) Address letter to the Facility's Installation Commander Name. Address the letter to an individual person.

(5) Compliance Report:

(6) Title page must cite Project title: P-(X); (1391 Project Name); Final Building Name if known; UIC (installation code); Owner Service; User organization if known; date of compliance.

(7) Include TPC scoresheet if applicable.

k. Once Final Certification is achieved, turn over Administrative rights to online TPC to the Public Works Office or designee, contact information provided by the Contracting Officer.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 SUSTAINABILITY COORDINATION

Provide sustainability focus and coordination at all meetings to achieve sustainability goals. Coordinate meeting requirements with other UFGS Sections meeting requirements in this project. Ensure the designated TPC accredited sustainability professional responsible for GP and TPC documentation participates in these meetings to coordinate documentation completion. Review GP and TPC sustainability requirements, HPSB Checklist and TPC documentation, Sustainability Action Plan, and completeness status of Sustainability eNotebook, and TPC status at the following meetings:

a. Pre-Construction Conference

b. Construction Quality Control Meetings

c. Refer to Section 01 30 00 ADMINISTRATIVE PROCEDURES for Post Award Meetings.

d. Post Award Meeting

e. Design Quality Assurance Meetings

f. Design Complete Review Meetings

g. Conduct review no later than 60 days after final design complete submission and identify any outstanding issues that affect correct completion of all documentation requirements, and actions that will achieve requirements. Conduct corrective actions.

h. Facility Turnover Meetings

i. Conduct review no later than 60 days before final turnover and identify any outstanding issues that affect correct completion of all documentation and final TPC certification, assessment or validation, and actions that will achieve requirements. Conduct corrective actions prior to turnover, to ensure all requirements are achieved.

3.2 THIRD-PARTY CERTIFICATION CERTIFICATE, ASSESSMENT, OR VALIDATION AND COMPLIANCE REPORT

Finalize the process requirements and obtain the TPC Certificate, assessment, or validation, and compliance report, indicating completion of the project's sustainability goals. Include TPC compliance report with final TPC scoresheet as applicable.

3.3 TABLE 3-1 VOLATILE ORGANIC COMPOUNDS (VOC) (LOW EMITTING MATERIALS) REQUIREMENTS

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements

Source: ICC IgCC Chapter 8 (Materials) (Interior Applications Only)

MATERIAL CATEGORY	EMISSIONS REQUIREMENT		MATERIALS WITH ADDED VOC REQUIREMENT	EMISSIONS REQUIREMENTS
Adhesives and Sealants	**CDPH/EHLB/Standard method V1.1 (California Section 01350)** (Use "office" or "classroom" space limits for all applications)	or	Adhesives (carpet, resilient, wood flooring; base cove; ceramic tile; drywall and panel; primers) Sealants (acoustical; firestop; HVAC Air duct; primers) Caulks	**SCAQMD Rule 1168** (Use "other" category for HVAC duct sealant) (for firestop adhesive, UFC 3-600-01 overrides conflicting requirements)
			Aerosol adhesives	**Section 3 of Green Seal Standard GS-36** (except: cleaners, solvent cements, and primers used with plastic piping and conduit in plumbing, fire suppression, and electrical systems; HVAC air duct sealants when the application space air temp is less than 40 F (4.5 C).

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements

Source: ICC IgCC Chapter 8 (Materials) (Interior Applications Only)

MATERIAL CATEGORY	EMISSIONS REQUIREMENT		MATERIALS WITH ADDED VOC REQUIREMENT	EMISSIONS REQUIREMENTS
Paints and Coatings	**CDPH/EHLB/Standard method V1.1 (California Section 01350)** (Use "office" or "classroom" space limits for all applications)	or	Flat and nonflat, nonflat high-gloss, specialty, basement specialty, fire-resistive, floor, low-solids, rust preventative, wood, reflective wall coatings; concrete/masonry sealers; primers; sealers; undercoaters; shellacs (clear and opaque); stains; varnishes; conjugated oil varnish; lacquer; clear brushing lacquer	**Green Seal Standard GS-11**

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements

Source: ICC IgCC Chapter 8 (Materials) (Interior Applications Only)

MATERIAL CATEGORY	EMISSIONS REQUIREMENT		MATERIALS WITH ADDED VOC REQUIREMENT	EMISSIONS REQUIREMENTS
Paints and Coatings	**CDPH/EHLB/Standard method V1.1 (California Section 01350)** (Use "office" or "classroom" space limits for all applications)	or	Concrete curing compounds; dry fog, faux finishing, graphic arts (sign paints), industrial maintenance, mastic texture, metallic pigmented, multicolor, recycled coatings; pretreatment wash primers, reactive penetrating sealers; specialty primers, wood preservatives, and zinc primers	**California Air Resources Board (CARB) Suggested Control Measure for Architectural Coatings** or **SCAQMD Rule 1113r**
Paints and Coatings	**CDPH/EHLB/Standard method V1.1 (California Section 01350)** (Use "office" or "classroom" space limits for all applications)	or	High-temperature coatings; stone consolidants; swimming-pool coatings; tub- and tile-refining coatings; and waterproofing membranes	**California Air Resources Board (CARB) Suggested Control Measure for Architectural Coatings**

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements

Source: ICC IgCC Chapter 8 (Materials) (Interior Applications Only)

MATERIAL CATEGORY	**EMISSIONS REQUIREMENT**		**MATERIALS WITH ADDED VOC REQUIREMENT**	**EMISSIONS REQUIREMENTS**
Floor Covering Materials	For carpet, all locations: **CDPH/EHLB/Standard Method V1.1 (California Section 01350)** or label for **Section 9** of **CDPH/EHLB/Standard Method V1.1 (California Section 01350)**		none	none
Insulation	**CDPH/EHLB/Standard method V1.1** (California Section 01350) (Use "office" or "classroom" space limits for all applications)		none	none

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements

Source: ICC IgCC Chapter 8 (Materials) (Interior Applications Only)

MATERIAL CATEGORY	EMISSIONS REQUIREMENT		MATERIALS WITH ADDED VOC REQUIREMENT	EMISSIONS REQUIREMENTS
Composite Wood, Wood Structural Panel, and Agrifiber Products, no added urea-formaldehyde resins including laminating adhesives for composite wood and agrifiber assemblies - particleboard, medium density fiberboard (MDF), wheatboard, strawboard, panel substrates, door cores	Third-party certification (approved by CARB) of **California Air Resource Board's (CARB) regulation**, Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products	or	none	**CDPH/EHLB/Standard method V1.1** (California Section 01350) (Use "office" or "classroom" space limits for all applications) (except: Structural panel components such as plywood, particle board, wafer board, and oriented strand board identified as "EXPOSURE 1," "EXTERIOR," or "HUD-APPROVED" are considered acceptable for interior use.)
Office Furniture Systems and Seating installed prior to occupancy	**ANSI/BIFMA X7.1 ANSI/BIFMA X7.1:** (95-percent of installed office furniture system workstations and seating units) **Section 7.6.2 of ANSI/BIFMA e3** (50-percent of office furniture system workstations and seating units)		none	none

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements

Source: ICC IgCC Chapter 8 (Materials) (Interior Applications Only)

MATERIAL CATEGORY	EMISSIONS REQUIREMENT		MATERIALS WITH ADDED VOC REQUIREMENT	EMISSIONS REQUIREMENTS
Ceiling and Wall assemblies and systems including: acoustical treatments; ceiling panels and tiles; tackable wall panels and coverings; wall coverings; wall and ceiling paneling and planking	**CDPH/EHLB/Standard method V1.1 (California Section 01350)** (Use "office" or "classroom" space limits for all applications)		none	none

-- End of Section --

NAVFAC HIGH PERFORMANCE AND SUSTAINABLE BUILDING CHECKLIST -- GOALS

PROJECT INFORMATION

Work Order No.: 1876546 FY 26 MILCON P No. / Customer Reference No.: 550

Project Title: Repair MCIS/MARDET Student Housing Building 550

Location UIC/Name: Oceana Nav.

NAVFAC Project Manager: Michele Elmer Project Design Level: DBrfp

Facility Area: 90,718 U/M: ____ Category Code: ____ Facility #: ____

AE Contract # & T.O. N40085-21-D0091/N44008525F1135 AE Firm Sustainability Coordinator: Phillip Brown

AE Firm Name: AECOM

Project Phase: [✔] Design Start / PDA [ ] Solicitation Documents Complete

Construction Contract Award Date (P): ____ BOD (P): ____

SUSTAINABILITY DATA - GUIDING PRINCIPLES for SUSTAINABLE DEVELOPMENT

Use this form to collect Design Goals information to be recorded on the Sustainable and Energy Tab in eProjects

NOTE: 1. Mark "N/A" only when at least one of the listed justifications is applicable, and mark those justifications. Otherwise, mark "Yes."
2. If project is for more than one building for which tracking is required, complete a separate form for each building.

PRELIMINARY PROJECT INFORMATION

1 How many buildings are included in this project? 1

2 New building or stand-alone addition >/=10,000 GSF

-OR-

Existing building renovation (including additions) >/=10,000 GSF, and with a cost >$3M and 50% Estimated Replacement Cost (ERC)? Yes [✔] No [ ]

3 Identify the building to be tracked in this tab: B550

DESIGN DEVELOPMENT - DOCUMENTATION OF COMPLIANCE WITH GUIDING PRINCIPLES

I. Employ Integrated Design Principles

1 Integrated Design Goals In Compliance [✔] Yes [ ] N/A

N/A due to

[ ] Mission preclusion [ ] Building/site issue
[ ] Not LCCE [ ] Renovation only: not part of scope
[ ] Installation/region issue

2 Commissioning Goals In Compliance [✔] Yes [ ] N/A

N/A due to

[ ] Mission preclusion [ ] Building/site issue
[ ] Not LCCE [ ] Renovation only: not part of scope
[ ] Installation/region issue

(i) Systems commissioned

II. Optimize Energy Performance

3. Energy Efficiency Goals In Compliance [✔] Yes [ ] N/A

N/A due to

[ ] Mission preclusion [ ] Building/site issue
[ ] Not LCCE [ ] Renovation only: not part of scope
[ ] Installation/region issue

(i) Energy Savings Below Baseline % 20.70

(ii) Energy Standard

- [ ] ASHRAE 90.1-2013 (06NOV16+)
- [ ] ASHRAE 90.1-2016
- [ ] IECC
- [x] OTHER:

ASHRAE 90.1-2019

C. Energy Efficient Products

Goals In Compliance [x] Yes [ ] N/A

N/A due to

- [ ] Mission preclusion
- [ ] Not LCCE
- [ ] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

4. Renewable Energy

Goals In Compliance [ ] Yes [x] N/A

N/A due to

- [ ] Mission preclusion
- [x] Not LCCE
- [ ] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

A. Renewable energy technology types

- [ ] Geothermal
- [ ] Ground Source Heat Pumps
- [x] Solar Photovoltaic
- [x] Solar Thermal - domestic hot water
- [ ] Solar Thermal - space conditioning
- [ ] Daylighting (quantified passive)
- [ ] Mechanical (i.e., direct water pumping)
- [ ] Micro-hydro
- [ ] Concentrating (sterling)
- [ ] Wind

(i) Annual % of total load _____

(ii) System size (kwatts) _____

B. Solar Hot Water Percentage - 30% target

Goals In Compliance [ ] Yes [x] N/A

N/A due to

- [ ] Mission preclusion
- [x] Not LCCE
- [ ] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

(i) Annual % of total load _____

(ii) System size (kBTU/Year) _____

5. Meter (Energy)

Goals In Compliance [x] Yes [ ] N/A

N/A due to

- [ ] Mission preclusion
- [ ] Not LCCE
- [ ] Installation/region issue
- [ ] Building/site issue
- [ ] Renovation only: not part of scope

6. Energy Use Intensity kBTU/Sq Ft/Year

(i) Total Design Energy Use Intensity (EUI): kBTU/Sq Ft/Year 38.0

III. Protect and Conserve Water

7. Indoor Water Use

A. Water-Efficient Products

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

(i) Total Design Indoor Water Use Intensity (WUI): Gallons/Sq Ft/Year _____

B. Indoor Water Meter

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

8. Outdoor Water Use

A. Outdoor Water Meter (for 25,000 SF of irrigation)

(i) Is there a permanent irrigation system serving more than 25,000 SF of landscaping?

☐ Yes ☑ No

(ii) Water Meter

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

B. Water-efficient landscape

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

9. Alternative Water Use (indoor or outdoor water)

Goals In Compliance ☐ Yes ☑ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☑ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

Methods Proposed:

☐ Air Handler Condensate Capture ☐ Reclaimed Water

☐ Grey Water ☐ Treated Wastewater

☐ Harvested Rainwater ☐ OTHER:

10. Stormwater Management - update the LID Data tab

IV. Enhance Indoor Environmental Quality

11. Ventilation and Thermal Comfort

A. Ventilation

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

B. Thermal Comfort

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

12. Daylighting and Lighting Controls

A. Daylight

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

B. Automatic dimming controls

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

13. Indoor Air Quality

A. Moisture Control

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

B. Low-Emitting Materials

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

C. Indoor Air Quality during Construction

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

14. Occupant Health and Wellness

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

V. Reduce the Environmental Impact of Materials

15. Material Content and Performance

A. Resource Conservation and Recovery Act (RCRA) Section 6002 (recycled content)

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

B. Farm Security and Rural Investment Act (FSRIA) section 9002 (Biobased content)

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

16. Waste Management

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

17. Waste Diversion - 60% target

Goals In Compliance ☑ Yes ☐ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☐ Renovation only: not part of scope

☐ Installation/region issue

(i) Percent diverted _____

VI. Assess and Consider Climate Change Risks

18. Address Climate Change Risk

Goals In Compliance ☐ Yes ☑ N/A

N/A due to

☐ Mission preclusion ☐ Building/site issue

☐ Not LCCE ☑ Renovation only: not part of scope

☐ Installation/region issue

THIRD PARTY CERTIFICATION INFORMATION

Is this building pursuing Third Party Certification? ☑ Yes ☐ No

N/A due to ☐ Installation/region issue ☐ Mission preclusion ☐ Renovation only: not part of scope

Sustainability Third Party Certification Rating

Third Party Certification Rating System and Level

☐ USGBC LEED Certified

☐ USGBC LEED Silver

☐ USGBC LEED Gold

☐ USGBC LEED Platinum

☐ USGBC "Guiding Principles Assessment"

☐ OTHER

☐ GBI Green Globes 1 Globe

☐ GBI Green Globes 2 Globe

☐ GBI Green Globes 3 Globe

☐ GBI Green Globes 4 Globe

☑ GBI "Guiding Principles Compliance"

i. Third Party Certification Rating system - Other

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PROJECT INFORMATION *For each building, provide separate Survey*	
Survey Type?	*Project Team Survey*
Project Execution Phase?	*1 - 34% Design Submittals*
Who is the project sponsor? (Command, etc.)	United States Marine Corps
Who is executing this project?	US Department of the Navy
Who owns/will own the building?	US Department of the Navy
Who is/will be the occupant(s)?	Marine Corps Intelligence School
What is the name of the project and/or building?	Repair MCIS/MARDET Student Housing Building 550
What is the street address?	405 Dam Neck Road
City:	Virginia Beach
State:	VA
Zip Code:	23454
What is the building type?	*Residence Hall / Dormitory*
What is the UIC Code?	Oceana Nav.
What is the intended space use?	Lodging
Is this a multiple buildings project? If so, how many?	No
What is the gross floor area of the building? (Sq. ft.)	90,718 GSF
What is the total site square footage or acreage?	~150,000 SF
How many stories are there?	3

ASHRAE, UFC, & UFGS APPLICABILITY *Identify the ASHRAE standards, UFC requirements, and UFGS requirements applicable to the project*	
Project teams are responsible for identifying ASHRAE Standard versions, Unified Facilities Criteria, and Unfied Facilities Guide Specifications as applicable to the project. For additional guidance and current ASHRAE, UFC, and UFGS documents visit the links provided below. This is not an exhaustive list of references. All reference material, including links, can be found in the DOD GPC NC Technical Reference Manual.	
ASHRAE 90.1 Energy Standard for Buildings Except Low-Rise Residential Buildings	*ASHRAE 90.1-2019*
READ-ONLY VERSIONS OF ASHRAE STANDARDS:	https://www.ashrae.org/technical-resources/standards-and-guidelines/read-only-versions-of-ashrae-standards
2018 INTERNATIONAL GREEN CONSTRUCTION CODE (IGCC) Basic	https://codes.iccsafe.org/content/IGCC2018P3
UFC 1-200-02 High Performance and Sustainable Building Requirements	01 December 2020, with Change 03, 08 July 2025
UFC 1-200-02 URL:	https://www.wbdg.org/dod/ufc/ufc-1-200-02
UFC 3-201-02 Landscape Architecture	29 April 2020, with Change 01, 09 February 2021
UFC 3-201-02 URL:	https://www.wbdg.org/dod/ufc/ufc-3-201-02
UFC 3-210-10 Low Impact Development	28-Aug-23
UFC 3-210-10 URL:	https://www.wbdg.org/dod/ufc/ufc-3-210-10

UFC 3-530-01 Interior and Exterior Lighting Systems and Controls	09 February 2023, with Change 01, 15 December 2023
UFC 3-530-01 URL:	https://www.wbdg.org/dod/ufc/ufc-3-530-01
UFGS 01 33 29 Sustainability Requirements and Reporting	February 2021, with Change 01, August 2025
UFGS 01 33 29 URL:	https://www.wbdg.org/dod/ufgs/ufgs-01-33-29
UFGS 01 78 00 Closeout Submittals	May 2019, with Change 01, August 2021
UFGS 01 78 00 URL:	https://www.wbdg.org/dod/ufgs/ufgs-01-78-00
PROJECT TEAM & IDP STAKEHOLDERS *List either the individuals or the firm, as applicable*	
Who is the point of contact (POC) for the project's executor?	Tamara Hopkins
Agent POC phone #:	1-757-994-5858
Agent POC email:	tamara.l.hopkins2.civ@us.navy.mil
Who is the point of contact (POC) for the owner?	Tamara Hopkins
Owner POC phone #:	1-757-994-5858
Owner POC email:	tamara.l.hopkins2.civ@us.navy.mil
Who is the building facilities manager?	Douglas Spence
Who is the commissioning authority or agent?	TBD
Who is the general contractor?	TBD
Who is the owner and/or leasing agency representative?	N/A
Who is the project architect?	Ann Minniear
Who is the project mechanical engineer?	Ryan Laporte
Who is the project electrical engineer?	Chris Welch
Who is the project structural engineer?	David Reynolds
Who is the sustainable design coordinator?	Phillip Brown
Who are the Occupant group Representatives?	Douglas Spence
Other 1:	
Other 2:	
Other 3:	
Other 4:	
Other 5:	
Other 6:	

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SECTION 01 35 13

SPECIAL PROJECT PROCEDURES
11/20, CHG 2: 08/25

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Existing Conditions Survey

Construction Operations Plan

SD-04 Samples

Model Unit

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 HAZARDS TO OPERATION

3.1.1 Schedule of Work Schedules

3.1.1.1 Construction Operations Plan

Submit a Construction Operations Plan prior to the start of work that includes a description of the airfield work to be accomplished; the exact location of the work, noting distances from the ends of buildings and other structures as necessary; and dates and hours during which the work is to be accomplished. Keep the approved schedule of work current and notify the Contracting Officer of changes prior to beginning each day's work.

3.1.1.2 Existing Conditions Survey

Perform an Existing Conditions Survey and submit results to the Government prior to the start of work. As part of this survey, inspect the work site to identify existing conditions located within the vicinity of the contract work. Utilize original as-builts if available showing possible utilities, type of pavement, thickness, equipment, vehicles, and structures. Unless already specified in the Contract documents, utilize the RFI process to clarify responsibility for relocating appurtenances that will interfere with work. If the site is opened up (in/under construction), update the existing survey condition to include the actual condition of the underlying conditions such as sub base, base, and pavement thickness.

3.1.2 Excavation

Open only those trenches for which material is on hand and ready for placing therein. As soon as possible after the material has been placed and work approved, backfill and compact the trenches as specified.

Maintain areas accessible to the public at all times free from hazards, holes, material piles, or projecting shoulders.

3.1.3 Base Civil Engineering (BCE) Work Clearance Request

Obtain an approved BCE Work Clearance Request, AF Form 103, prior to the start of excavation, digging work, or work that disrupts aircraft or vehicular traffic flow, base utility services, fire and intrusion alarm system, or routine activities of the Activity.

3.2 MODEL UNIT

Prior to placement of material orders for components of the barrack sleeping units, including the typical two person units and the accessible ABA unit, and the installation of those components throughout the project, the Contractor must complete the construction of the components of the model unit, and gain the approval of the Contracting Officer for the materials and workmanship therein.

3.2.1 Model Unit Description

Provide a model unit made up of enough sleeping/living area and bathroom to show all of the different levels of completion required below. The model unit must have enough to show all level of completion simultaneously. The model unit must be constructed at the location agreed upon with the Contracting Officer and a part of the permanent structure as indicated.

3.2.2 Model Unit Requirements

Adhere to the following requirements for model construction:

a. Provide materials in model unit identical to those actually approved in submittals. The QC Manager and Organization must approve and process submittals in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES. Do not procure, fabricate, or install materials prior to approval by the Contracting Officer.

b. The Contracting Officer retains the right to disapprove and reject materials or items which are not in compliance with the project drawings and specifications.

c. After approval of initial product submittals, provide full size samples of these components in the required color, and in sufficient quantity to completely outfit the model unit. Provide full size samples as dictated by the construction schedule for installation of those components in the model unit. Do not order or approve production of materials beyond those required for the model unit, until the full size samples have been installed in the model unit and approved by the Contracting Officer.

d. Proceed immediately with construction of the model unit after the Contracting Officer acknowledges the required product submittals are

approved.

e. Provide temporary utilities and climate control necessary to construct, inspect, approve, and maintain the model unit.

f. Provide and maintain the following throughout the construction period of the entire project: Temporary parking at the model unit; signage from the temporary parking to the model unit; the visual approach to the unit including trash removal, lawn maintenance.

g. Locate the model unit in an easily accessible location for public tours. The Government retains the right to use the model unit for supervised tours and public relations activities following each level of completion. Tours will take place during normal working hours.

h. Prior to completion and approval of the model unit, and with written permission to start from the Contracting Officer, the Contractor may perform general sitework and run major utility lines for the rest of the project.

i. As each model unit's level of completion is approved by the Contracting Officer, construction of that level's components throughout the remainder of the project may proceed.

3.2.3 Model Unit Levels of Completion

Exhibit and secure approval of model unit at the following levels of completion:

a. Level 1 (Pre-Finished Level) - Model unit construction within a completed building exterior must exhibit plumbing, ductwork, electrical locations, exposed framing, and windows. Leave walls and floors unfinished but ready for application of final finish. Upon completion of this level, model unit must be available to the Government for a period of five working days for inspection.

b. Level 2 (Finished Level) - Model unit construction must exhibit all materials, completely finished as specified, including fixtures, wall and floor finishes, cabinets, and shelving. Upon completion, the model unit must be available to the Government for a period of 15 working days for inspection.

Model unit must be exhibited and approved at the following 7 levels of completion:

c. Level 1, model must be available for Government inspection for 28 calendar days.

d. Levels 2 through 7, model unit must be available for Government inspection for 10 calendar days per level.

a. Level 2 (Framing Level) - Clearly exhibit all load bearing and non-load bearing framing, sheathing, anchorage for exterior shell materials, and pre-trim frame-out.

b. Level 3 (Exterior Shell Level) - Exhibit all exterior finishes, windows and doors with temporary hardware, caulking, sealant, sheathing paper, wall ties, locations of mechanical equipment, roofing, louvers, vents and trim.

c. Level 4 (Plumbing, Mechanical and Electrical rough-in Level) - Exhibit electrical conduit and box location for switches, outlets fixtures, cable and data collection, ductwork, built-in plumbing fixtures, plumbing piping, and water pressure test of all plumbing pipe.

d. Level 5 (Interior Finishes-rough Level) - Exhibit non-veneer plaster, unspackled and uncaulked wall and ceiling finishes, insulation, interior doors, final locations of all outlets and fixtures.

e. Level 6 (Interior Finishes & Fixtures-final Level) - Exhibit final interior finishes, veneer plaster, painting, caulking, built-in shelving, cabinetwork, cabinet supported sinks, final door hardware, mechanical louvers, final electrical equipment connections, electrical fixtures, freestanding bathroom fixtures, properly functioning appliances, and operation of mechanical and electrical systems.

f. Level 7 (Site Finishes Level) - Exhibit final driveway, walks, exterior stairs, final concrete and asphalt finished surface treatment, topsoil quality and application, sodding/seeding of lawn, tree and shrub planting, landscaping beds, playground fall areas and playground equipment. Contracting Officer retains the right to inspect all preparation and installation of pavings. Provide adequate notice to the Contracting Officer prior to commencing paving work.

-- End of Section --

SECTION 01 35 26

GOVERNMENTAL SAFETY REQUIREMENTS
05/24, CHG 1: 05/25

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 SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 52.2	(2017; Addenda B 2020; Errata 1 2020; Addenda C 2022; Errata 2 2024; Addenda D 2025) Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ANSI/ASSP A10.34	(2021) Protection of the Public on or Adjacent to Construction Sites
ANSI/ASSP A10.44	(2020) Control of Energy Sources (Lockout/Tagout) for Construction and Demolition Operations

ASTM INTERNATIONAL (ASTM)

ASTM D6245	(2012) Using Indoor Carbon Dioxide Concentrations to Evaluate Indoor Air Quality and Ventilation
ASTM D6345	(2010) Standard Guide for Selection of Methods for Active, Integrative Sampling of Volatile Organic Compounds in Air
ASTM F855	(2020) Standard Specifications for Temporary Protective Grounds to Be Used on De-energized Electric Power Lines and Equipment

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 1048	(2016) Guide for Protective Grounding of Power Lines
IEEE C2	(2023) National Electrical Safety Code

INTERNATIONAL SAFETY EQUIPMENT ASSOCIATION (ISEA)

ANSI/ISEA Z89.1	(2014; R 2019) American National Standard for Industrial Head Protection

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA Z535.2	(2011; R 2017) Environmental and Facility Safety Signs

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 51B	(2024) Standard for Fire Prevention During Welding, Cutting, and Other Hot Work
NFPA 70	(2023; ERTA 1 2024; TIA 24-1; TIA 25-2) National Electrical Code
NFPA 70E	(2024) Standard for Electrical Safety in the Workplace
NFPA 241	(2022; ERTA 22-1) Standard for Safeguarding Construction, Alteration, and Demolition Operations
NFPA 306	(2024) Standard for the Control of Gas Hazards on Vessels

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

ANSI/SMACNA 008	(2007) IAQ Guidelines for Occupied Buildings Under Construction, 2nd Edition

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements

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

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1915	Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment
29 CFR 1926	Safety and Health Regulations for Construction
CPL 2.100	(1995) Application of the Permit-Required Confined Spaces (PRCS) Standards, 29 CFR 1910.146

1.2 DEFINITIONS

The following definitions are for the convenience of the reader. If there is a referenced document in the text of this specification section, that is the document that should define terms for that paragraph. If further clarification is needed, contact the Contracting Officer.

1.2.1 Site Safety and Health Officer (SSHO)

A Contractor Employee that is responsible for overseeing and ensuring

implementation of the prime Contractor's Safety and Occupational Health (SOH) program according to the Contract, EM 385-1-1, applicable federal, state, and local requirements.

1.2.1.1 Level One SSHO

A designated employee with full-time SOH responsibility that meets and follows the requirements of EM 385-1-1.

1.2.1.2 Alternate SSHO

An employee that meets the definition of the contract-required level SSHO, but is not the primary SSHO.

1.2.2 Competent Person (CP)

The CP is a person designated in writing, who, through training, knowledge and experience, is capable of identifying, evaluating, and addressing existing and predictable hazards in the working environment or working conditions that are unsanitary, hazardous, or dangerous to personnel, and who has authorization to take prompt corrective measures to eliminate them.

1.2.3 Qualified Person (QP)

The QP is a person designated in writing, who, by possession of a recognized degree, certificate, or professional standing, or extensive knowledge, training, and experience, has successfully demonstrated their ability to solve or resolve problems related to the subject matter, the work, or the project.

1.3 SUBMITTALS

Government Acceptance or Approval does not remove responsibility from the Contractors for their actions or liability.

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Accident Prevention Plan (APP) Design; G

Accident Prevention Plan (APP) Construction; G

Final IAQ Management Plan; S

Indoor Air Quality (IAQ) Management Plan; G

SD-06 Test Reports

Accident Reports; G

LHE Inspection Reports

Monthly Exposure Reports; G

SD-07 Certificates

Activity Hazard Analysis (AHA); G

Certificate of Compliance

Contractor Safety Self-Evaluation Checklist

Hot Work Permit

Standard Lift Plan; G

Critical Lift Plan; G

1.4 PUBLIC HEALTH EMERGENCIES

In the event of a declared public health emergency, follow safety precautions as required by the Occupational Safety and Health Administration (OSHA) www.osha.gov, the Centers for Disease Control and Prevention (CDC) www.cdc.gov, and as required by federal, state and local requirements.

1.5 MONTHLY EXPOSURE REPORTS

Provide a Monthly Exposure Report by the fifth day of each month for the previous month. This report is a compilation of employee-hours worked each month for all site workers, both Prime and subcontractor. Failure to submit the report may result in retention of up to 10 percent of the progress payment.

1.6 CONTRACTOR SAFETY SELF-EVALUATION CHECKLIST

Contracting Officer will provide a "Contractor Safety Self-Evaluation checklist" to the Contractor at the preconstruction conference. Complete the checklist monthly and submit with each request for payment voucher. This submission is required monthly even when a payment voucher is not requested. 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 may result in retention of up to 10 percent of the voucher. The Contractor Safety Self-Evaluation checklist can be found on the Whole Building Design Guide website at www.wbdg.org/dod/ufgs/ufgs-01-35-26

1.7 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, and the following federal, state, and local laws, ordinances, criteria, rules and regulations at the date of the Solicitation for this Contract. 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.

1.7.1 Subcontractor Safety Requirements

For this Contract, neither Contractor nor any subcontractor may enter into

Contract with any subcontractor that fails to meet the following requirements. The term subcontractor in this and the following paragraphs means any entity holding a Contract with the Contractor or with a subcontractor at any tier.

1.7.1.1 Experience Modification Rate (EMR)

Subcontractors on this Contract must have an effective EMR less than or equal to 1.10, as computed by the National Council on Compensation Insurance (NCCI) or if not available, as computed by the state agency's rating bureau in the state where the subcontractor is registered, when entering into a subcontract agreement with the Prime Contractor or a subcontractor at any tier. The Prime Contractor may submit a written request for additional consideration to the Contracting Officer where the specified acceptable EMR range cannot be achieved. Relaxation of the EMR range will only be considered for approval on a case-by-case basis for special conditions and must not be anticipated as tacit approval. Contractor's Site Safety and Health Officer (SSHO) must collect and maintain the certified EMR ratings for all subcontractors on the project and make them available to the Government at the Government's request.

1.7.1.2 OSHA Days Away from Work, Restricted Duty, or Job Transfer (DART) Rate

Subcontractors on this Contract must have a DART rate, calculated from the most recent, complete calendar year, less than or equal to 3.4 when entering into a subcontract agreement with the Prime Contractor or a subcontractor at any tier. The OSHA Dart Rate is calculated using the following formula:

(N/EH) x 200,000

Where:

N = number of injuries and illnesses with days away, restricted work, or job transfer

EH = total hours worked by all employees during most recent, complete calendar year

200,000 = base for 100 full-time equivalent workers (working 40-hours per week, 50 weeks per year)

The Prime Contractor may submit a written request for additional consideration to the Contracting Officer where the specified acceptable OSHA Dart rate range cannot be achieved for a particular subcontractor. Relaxation of the OSHA DART rate range will only be considered for approval on a case-by-case basis for special conditions and must not be anticipated as tacit approval. Contractor's Site Safety and Health Officer (SSHO) must collect and maintain self-certified OSHA DART rates for all subcontractors on the project and make them available to the Government at the Government's request.

1.8 SITE QUALIFICATIONS, DUTIES, AND MEETINGS

1.8.1 Site Safety and Health Officer (SSHO)

1.8.1.1 Qualifications of SSHO

All SSHOs will have met the training, experience requirements identified in the EM 385-1-1 and this Contract.

1.8.1.2 Duties of SSHO

All SSHOs will carry out the roles and responsibilities as identified in this Contract and the EM 385-1-1. All SSHOs will be designated on an ENG Form 6282, provided by the Contracting Officer. Superintendent, QC Manager, and SSHO are subject to dismissal if their required duties are not being effectively carried out. If either the Superintendent, QC Manager, or SSHO are dismissed, project work will be stopped and will not be allowed to resume until a suitable replacement is approved and the above duties are again being effectively carried out.

1.8.1.3 Safety Meetings

Conduct safety meetings to review past activities, plan for new or changed operations, review pertinent aspects of appropriate AHA (by trade), establish safe working procedures for anticipated hazards, and provide pertinent Safety and Occupational Health (SOH) training and motivation. Conduct meetings at least once a month for all supervisors at the project location. The SSHO, supervisors, or foremen must conduct meetings at least once a week for the trade workers. Document meeting minutes to include the date, persons in attendance, subjects discussed, and names of individual(s) who conducted the meeting. Maintain documentation on-site and furnish copies to the Contracting Officer on request. Notify the Contracting Officer of all scheduled meetings 7 calendar days in advance.

1.8.2 Roles and Responsibilities of Prime Contractor and SSHO

The Prime Contractor and SSHO must ensure that the requirements of all applicable OSHA and EM 385-1-1 are met for the project. The Prime Contractor must ensure an SSHO or an equally qualified Alternate SSHO(s) is at the worksite at all times to implement and administer the Contractor's safety program and Government accepted Accident Prevention Plan. If the required SSHO has to temporarily (that is, up to 24 hours / 1 day) leave the site of work due to unforeseen or emergency situations, a Level One, Two, or Three SSHO may be used in the interim and must be on the site of work at all times when work is being performed.

If the SSHO must be off-site for a period longer than 24 hours / 1 day, a qualified alternate that meets the contract requirements must be onsite.

a. Prime contractor must ensure all SSHOs will:

(1) Are designated on an ENG Form 6282.

(2) Meet minimum training and experience requirements identified in EM 385-1-1.

(3) Execute roles and responsibilities identified in EM 385-1-1.

1.8.3 Additional Requirements

The Level One SSHO must not serve as the Quality Control Manager. The One SSHO must not serve as the Superintendent.

1.8.4 Contract Site Safety And Health Officer(s)(SSHOs) Minimum Requirements

Provide a minimum of one Level One SSHO that meets the requirements of EM 385-1-1 for this project.

1.8.5 Competent Person for Confined Space Entry

Provide a CP for Confined Space Entry who meets the requirements of EM 385-1-1 and herein. The CP for Confined Space Entry must supervise the entry into each confined space in accordance with EM 385-1-1.

Since this work involves operations that handle combustible or hazardous materials, this person must have the ability to understand and follow through on the air sampling, Personal Protective Equipment (PPE), and instructions of a Marine Chemist, Coast Guard authorized persons, or Certified Industrial Hygienist. Confined space and enclosed space work must comply with NFPA 306, 29 CFR 1915, "Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment," or as applicable in 29 CFR 1910 for general industry, 29 CFR 1926 for construction.

1.8.6 Qualified Trainer Requirements

Individuals qualified to instruct the 40-hour contract safety awareness course, or portions thereof, must meet the definition of a Competent Person Trainer as defined in the EM 385-1-1, and, at a minimum, possess a working knowledge of the following subject areas: EM 385-1-1, Electrical Standards, Lockout/Tagout, Fall Protection, Confined Space Entry for Construction; Excavation, Trenching and Soil Mechanics, and Scaffolds in accordance with 29 CFR 1926.

Instructors are required to:

a. Prepare class presentations that cover construction-related safety requirements.

b. Ensure that all attendees attend all sessions by using a class roster signed daily by each attendee. Maintain copies of the roster for at least 5 years. This is a certification class and must be attended 100 percent. In cases of emergency where an attendee cannot make it to a session, the attendee can make it up in another class session for the same subject.

c. Update training course materials whenever an update of the EM 385-1-1 becomes available.

d. Provide a written exam of at least 50 questions. Students are required to answer 80 percent correctly to pass.

e. Request, review and incorporate student feedback into a continuous course improvement program.

1.8.7 Preconstruction Conference

a. Contractor representatives who have a responsibility or significant role in accident prevention on the project must attend the preconstruction conference. This includes the project superintendent, Site Safety and Occupational Health Officer, quality control manager, 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 and an agreement will be reached between the Contractor and the Contracting Officer as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, and Government review of AHAs to preclude project delays. The creation of the APP and Schedule will be created after being given Notice to Proceed.

c. Deficiencies in the submitted APP, identified during the Contracting Officer's review, must be corrected, and the APP re-submitted for review prior to the start of construction. Work is not permitted to begin until an APP is established that is acceptable to the Contracting Officer.

1.9 ACCIDENT PREVENTION PLAN (APP)

1.9.1 Accident Prevention Plan (APP) Design

Provide a site-specific Accident Prevention Plan (APP), including Activity Hazard Analyses (AHA), in accordance with EM 385-1-1, ENG Form 6293, for the design team to follow during site visits and investigations. For subsequent visits, update the plan if there are changes in the personnel who will be attending, or the tasks to be performed. Submit the APP for review and acceptance by the Government at least 15 calendar days prior to the start of the design field work after being given Notice to Proceed. Field work must not begin until the design APP is accepted by the Contracting Officer. Prior to the start of construction incorporate the Design APP into the Construction APP so that one site specific APP exists for the project and submit to the Contracting Officer for acceptance.

If the design scope includes borings or other subsurface investigations, include in the APP the type of field investigation and verification techniques, such as visual, local utility locating service scanning and third party subcontractor scanning, potholing, or hand digging within two feet of a known utility that will be required. Mark underground utilities before starting any ground-disturbing actions. Notify the Contracting Officer 15 days prior to the start of soil borings or sub-surface investigations.

1.9.2 Accident Prevention Plan (APP) Construction

Submit the Accident Prevention Plan (APP) for review and acceptance by the Government at least 15 calendar days prior to the start, after being given Notice to Proceed. A competent person must prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of EM 385-1-1, ENG Form 6293, and herein. The APP must be job-specific and address any unusual or unique aspects of the project or

activity for which it is written. The APP must interface with the Contractor's overall safety and occupational health program referenced in the APP in the applicable APP element, and made site-specific. Describe the methods to evaluate past safety performance of potential subcontractors in the selection process. Also, describe innovative methods used to ensure and monitor safe work practices of subcontractors. The Government considers the Prime Contractor to be the "controlling employer" for all worksite 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 must be signed in accordance with the APP and ENG Form 6293 Accident Prevention Plan Worksheet. The SSHO must provide and maintain the APP and a log of signatures by each subcontractor foreman, attesting that they have read and understand the APP, and make the APP and log available on-site to the Contracting Officer. If English is not the foreman's primary language, the Prime Contractor must provide an interpreter.

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 reviewed and 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 is cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified. Continuously review and amend the APP, as necessary, throughout the life of the Contract. Changes to the accepted APP must be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSHO and Quality Control Manager. Incorporate unusual or high-hazard activities not identified in the original APP as they are discovered. 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 and 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 ANSI/ASSP A10.34), and the environment.

1.9.3 Names and Qualifications

Provide plans in accordance with the requirements outlined in EM 385-1-1, including the following:

a. Names and qualifications (resumes including education, training, experience and certifications) of 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. Specify the duties of each position.

b. As a minimum, designate and submit qualifications of Competent Persons (CP) 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; and personal protective equipment and clothing to include selection, use and maintenance. Designate and submit qualifications for additional CPs as applicable to the work performed

under this Contract.

1.9.4 Plans

Provide plans in the APP in accordance with the requirements outlined in EM 385-1-1, including the following:

1.9.4.1 Lead, Cadmium, and Chromium Compliance Plan

Identify the safety and health aspects of work involving lead, cadmium and chromium, and prepare in accordance with Section 02 83 00 LEAD REMEDIATION.

1.9.4.2 Asbestos Hazard Abatement Plan

Identify the safety and health aspects of asbestos work, and prepare in accordance with Section 02 82 00 ASBESTOS REMEDIATION.

1.9.4.3 Site Safety and Health Plan

Identify the safety and health aspects, and prepare in accordance with Section 01 35 29.13 HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES FOR CONTAMINATED SITES.

1.9.4.4 Polychlorinated Biphenyls (PCB) Plan

Identify the safety and health aspects of Polychlorinated Biphenyls work, and prepare in accordance with Sections 02 84 33 REMOVAL AND DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs).

1.9.4.5 Site Demolition Plan

Identify the safety and health aspects, and prepare in accordance with Section 02 41 00 DEMOLITION and referenced sources. Include engineering survey as applicable.

1.10 ACTIVITY HAZARD ANALYSIS (AHA)

Before beginning each activity, task or Definable Feature of Work (DFOW) involving a type of work presenting hazards not experienced in previous project operations, or where a new work crew or subcontractor is to perform the work, the Contractor(s) performing that work activity must prepare an AHA. AHAs must be developed by the Prime Contractor, subcontractor, or supplier performing the work, and provided for Prime Contractor review and approval before submitting to the Contracting Officer. AHAs must be signed by the SSHO, Superintendent, QC Manager and the subcontractor Foreman performing the work. Format the AHA in accordance with EM 385-1-1 or as directed by the Contracting Officer. Submit the AHA for review at least 15 working days prior to the start of each activity task, or DFOW. The Government reserves the right to require the Contractor to revise and resubmit the AHA if it fails to effectively identify the work sequences, specific anticipated hazards, site conditions, equipment, materials, personnel and the control measures to be implemented.

AHAs must identify competent persons required for phases involving high risk activities, including confined entry, crane and rigging, excavations, trenching, electrical work, fall protection, and scaffolding.

1.10.1 AHA Management

Review the AHA list periodically (at least monthly) at the Contractor supervisory safety meeting, and update as necessary when procedures, scheduling, or hazards change. Use the AHA during daily inspections by the SSHO to ensure the implementation and effectiveness of the required safety and health controls for that work activity.

1.10.2 AHA Signature Log

Each employee performing work as part of an activity, task or DFOW must review the AHA for that work and sign a signature log specifically maintained for that AHA prior to starting work on that activity. The SSHO must maintain a signature log on site for every AHA. Provide employees whose primary language is other than English, with an interpreter to ensure a clear understanding of the AHA and its contents.

1.11 SITE SAFETY REFERENCE MATERIALS

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

1.12 EMERGENCY MEDICAL TREATMENT

Contractors must arrange for their own emergency medical treatment in accordance with EM 385-1-1. The Government has no responsibility to provide emergency medical treatment.

1.13 NOTIFICATIONS AND REPORTS

1.13.1 Accident Notification

Notify the Contracting Officer in accordance with the EM 385-1-1 Accident Reporting Timeline.

Table
Accident Reporting Required Timeline

Accident Type	Notify KO or COR	Complete Final Accident Report on ENG 3394 and provide to KO or COR
Fatality, in-patient hospitalization, amputation, eye loss, or property damage over $600,000.	Immediately, no later than (NLT) 8 Hours	Within 7 Days
All other accidents and near misses	Immediately, no later than (NLT) 24 Hours	Within 7 Days

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 (for example, type of construction equipment used and PPE

used). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted. Assist and cooperate fully with the Government's investigation(s) of any accident or near miss.

1.13.2 Accident Reports

a. Conduct an accident investigation for recordable injuries and illnesses, property damage, and near misses as defined in EM 385-1-1, to establish the root cause(s) of the accident. Complete the applicable NAVFAC Contractor Incident Reporting System (CIRS), and electronically submit via the NAVFAC Enterprise Safety Applications Management System (ESAMS). Complete and submit an accident investigation report in ESAMS within 7 days for accidents as defined by EM 385-1-1. Complete the investigation report within 30 days. Accidents must include a written report submitted as an attachment in ESAMS using the following outline:

(1) Summary description to include:

(a) process

(b) findings

(c) outcomes

(2) Root Cause

(3) Direct Factors

(4) Indirect and Contributing Factors

(5) Corrective Actions

(6) Recommendations

All accidents are reportable, regardless of whether or not it is recordable.

a. Near Misses: For Navy Projects, complete the applicable documentation in NAVFAC Contractor Incident Reporting System (CIRS), and electronically submit via the NAVFAC Enterprise Safety Applications Management System (ESAMS). Near miss reports are considered positive and proactive Contractor safety management actions.

b. Conduct an accident investigation for any load handling equipment accident (including rigging accidents) to establish the root cause(s) of the accident. Complete the Load Handling Equipment (LHE) Accident Report (Crane and Rigging Accident Report) 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.

1.13.3 LHE Inspection Reports

Submit LHE inspection reports required in accordance with EM 385-1-1 and as specified herein with Daily Reports of Inspections.

1.13.4 Certificate of Compliance and Pre-lift Plan/Checklist for LHE and Rigging

1.13.4.1 Certificate of Compliance

Provide a Certificate of Compliance for LHE utilized to perform work under this Contract in accordance with Section 16-7 of the EM 385-1-1. Post completed certificate on the crane.

1.13.4.2 Pre-Lift Plans

Develop either a Standard Lift Plan (SLP) or Critical Lift Plan (CLP) as required in accordance with EM 385-1-1. Utilize the Standard Lift Plan ENG Form 6203 for routine crane lifts and use the Critical Lift Plan ENR Form 6213 for non-routine crane lifts requiring more detailed planning and additional safety precautions, as defined by Section 16-2j of the EM 385-1-1. Submit lift plans to the Contracting Officer for approval within 15 calendar days in advance of planned lift.

1.14 HOT WORK PERMIT

1.14.1 Permit and Personnel Requirements

Submit and obtain a written permit prior to performing "Hot Work" (i.e., welding or cutting) 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. Provide at least two 20 pound 4A:20 BC rated extinguishers for normal "Hot Work". The extinguishers must be current inspection tagged, and contain an 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 must be trained in accordance with NFPA 51B and remain on-site for a minimum of 1 hour 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. Report any fire, no matter how small, to the responsible Fire Division immediately.

1.14.2 Work Around Flammable Materials

Obtain permit approval from a NFPA Certified Marine Chemist, or Certified Industrial Hygienist for "Hot Work" within or around flammable materials (such as fuel systems or welding/cutting on fuel pipes) or confined spaces (such as sewer wet wells, manholes, or vaults) that have the potential for flammable or explosive atmospheres.

Whenever these materials, except beryllium and chromium (VI), are encountered in indoor operations, local mechanical exhaust ventilation systems that are sufficient to reduce and maintain personal exposures to within acceptable limits must be used and maintained in accordance with manufacturer's instruction and supplemented by exceptions noted in

EM 385-1-1.

1.15 CONFINED SPACE ENTRY REQUIREMENTS

Confined space entry must comply with EM 385-1-1, 29 CFR 1926, 29 CFR 1910, and Directive CPL 2.100. Any potential for a hazard in the confined space requires a permit system to be used.

1.15.1 Rescue Procedures and Coordination with Local Emergency Responders

Develop and implement an on-site rescue and recovery plan and procedures. The rescue plan must not rely on local emergency responders for rescue from a confined space.

1.16 CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT PLAN

Submit an IAQ Management Plan within 15 calendar days after design and not less than 10 calendar days before the preconstruction conference. Revise and resubmit Plan as required by the Contracting Officer. Make copies of the final plan available to all workers on site. Include provisions in the Plan to meet the requirements specified below and to ensure safe, healthy air for construction workers and building occupants. Submit Final IAQ Management Plan for inclusion in the Sustainability eNotebook, in accordance with Section 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING.

1.16.1 Requirements During Construction

Provide for evaluation of indoor Carbon Dioxide concentrations in accordance with ASTM D6245. Provide for evaluation of volatile organic compounds (VOCs) in indoor air in accordance with ASTM D6345. Use filters with a Minimum Efficiency Reporting Value (MERV) of 8 in permanently installed air handlers during construction.

1.16.1.1 Control Measures

Meet or exceed the requirements of ANSI/SMACNA 008 to help minimize contamination of the building from construction activities. The five requirements of this manual which must be adhered to are described below:

a. HVAC protection: Isolate return side of HVAC system from surrounding environment to prevent construction dust and debris from entering the duct work and spaces.

b. Source control: Use low emitting paints and other finishes, sealants, adhesives, and other materials as specified. When available, cleaning products must have a low VOC content and be non-toxic to minimize building contamination. Utilize cleaning techniques that minimize dust generation. Cycle equipment off when not needed. Prohibit idling motor vehicles where emissions could be drawn into building. Designate receiving/storage areas for incoming material that minimize IAQ impacts.

c. Pathway interruption: When pollutants are generated use strategies such as 100 percent outside air ventilation or erection of physical barriers between work and non-work areas to prevent contamination.

d. Housekeeping: Clean frequently to remove construction dust and debris. Promptly clean up spills. Remove accumulated water and keep work areas dry to discourage the growth of mold and bacteria. Take

extra measures when hazardous materials are involved.

e. Scheduling: Control the sequence of construction to minimize the absorption of VOCs by other building materials.

1.16.1.2 Moisture Contamination

a. Remove accumulated water and keep work dry.

b. Use dehumidification to remove moist, humid air from a work area.

c. Do not use combustion heaters or generators inside the building.

d. Protect porous materials from exposure to moisture.

e. Remove and replace items which remain damp for more than a few hours.

1.16.2 Requirements After Construction

After construction ends and prior to occupancy, conduct a building flush-out or test the indoor air contaminant levels. Flush-out must be a minimum 2 weeks with MERV-13 filtration media as determined by ASHRAE 52.2 at 100 percent outside air. Air contamination testing must be consistent with EPA's current Compendium of Methods for the Determination of Air Pollutants in Indoor Air. After building flush-out or testing and prior to occupancy, replace filtration media. Filtration media must have a MERV of 13 as determined by ASHRAE 52.2.

1.17 SEVERE STORM PLAN

In the event of a severe storm warning, the Contractor must comply with the applicable Storm Plan and:

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 for confined spaces must comply with NEMA Z535.2. Provide signs with 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" must be red and readable from 5 feet.

PART 3 EXECUTION

3.1 CONSTRUCTION AND OTHER WORK

Comply with EM 385-1-1, NFPA 70, NFPA 70E, NFPA 241, the APP, the AHA,

Federal and State OSHA regulations, and other related submittals and activity fire and safety regulations. The most stringent standard prevails.

PPE is governed in all areas by the nature of the work the employee is performing. Use personal hearing protection at all times in designated noise hazardous areas or when performing noise hazardous tasks. Safety glasses must be worn or carried/available on each person. Mandatory PPE includes:

a. Head Protection that meets ANSI/ISEA Z89.1

b. Long Pants

c. Appropriate Safety Footwear

d. Appropriate Class Reflective Vests

3.1.1 Worksite Communication

Employees working alone in a remote location or away from other workers must be provided an effective means of emergency communications (i.e., cellular phone, two-way radios, land-line telephones or other acceptable means). The selected communication must be readily available (easily within the immediate reach) of the employee and must be tested prior to the start of work to verify that it effectively operates in the area/environment. Develop an employee check-in/check-out communication procedure to ensure employee safety.

3.1.2 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.

3.1.3 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 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-isocyanates, lead-based paint, and hexavalent chromium, are prohibited. The Contracting Officer, upon written request by the Contractor, may consider exceptions to the use of any of the above excluded materials. Low mercury lamps used within fluorescent lighting fixtures are allowed as an exception without further Contracting Officer approval. Notify the Radiation Safety Officer (RSO) prior to excepted items of radioactive material and devices being brought on base.

3.1.4 Unforeseen Hazardous Material

Contract documents identify materials such as PCB, lead paint, and friable and non-friable asbestos and other OSHA regulated chemicals (i.e., 29 CFR Part 1910.1000). If material(s) that can be hazardous to human health

upon disturbance are encountered during demolition, repair, renovation, or construction operations, stop portions of work that would disturb the material 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.

3.2 UTILITY OUTAGE REQUIREMENTS

Apply for utility outages at least 15 days in advance. At a minimum, the written request must include the location of the outage, utilities being affected, duration of outage, any necessary sketches, and a description of the means to fulfill energy isolation requirements in accordance with EM 385-1-1. In accordance with EM 385-1-1, where outages involve Government or Utility personnel, coordinate with the Government on all activities involving the control of hazardous energy.

These activities include, but are not limited to, a review of Hazardous Energy Control Program (HECP) and HEC procedures, as well as applicable Activity Hazard Analyses (AHAs). In accordance with EM 385-1-1 and NFPA 70E, work on energized electrical circuits must not be performed without prior Government authorization. Government permission is considered through the permit process and submission of a detailed AHA. Energized work permits are considered only when de-energizing introduces additional or increased hazard or when de-energizing is infeasible.

3.3 OUTAGE COORDINATION MEETING

After the utility outage request is approved and prior to beginning work on the utility system requiring shut-down, conduct a pre-outage coordination meeting in accordance with EM 385-1-1. This meeting must include the Prime Contractor, the Prime and subcontractors performing the work, the Contracting Officer, and the Installation representative Public Utilities representative. All parties must fully coordinate HEC activities with one another. During the coordination meeting, all parties must discuss and coordinate on the scope of work, HEC procedures (specifically, the lock-out/tag-out procedures for worker and utility protection), the AHA, assurance of trade personnel qualifications, identification of competent persons, and compliance with HECP training in accordance with EM 385-1-1. Clarify when personal protective equipment is required during switching operations, inspection, and verification.

3.4 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

Provide and operate a Hazardous Energy Control Program (HECP) in accordance with EM 385-1-1, 29 CFR 1910, 29 CFR 1915, ANSI/ASSP A10.44, NFPA 70E.

3.4.1 Safety Preparatory Inspection Coordination Meeting with the Government or Utility

For electrical distribution equipment that is to be operated by Government or Utility personnel, the Prime Contractor and the subcontractor performing the work must attend the safety preparatory inspection coordination meeting, which will also be attended by the Contracting Officer's Representative, and required by EM 385-1-1. The meeting will occur immediately preceding the start of work and following the completion

of the outage coordination meeting. Both the safety preparatory inspection coordination meeting and the outage coordination meeting must occur prior to conducting the outage and commencing with lockout/tagout procedures.

3.4.2 Lockout/Tagout Isolation

Where the Government or Utility performs equipment isolation and lockout/tagout, the Contractor must place their own locks and tags on each energy-isolating device and proceed in accordance with the HECP. Before any work begins, both the Contractor and the Government or Utility must perform energy isolation verification testing while wearing required PPE detailed in the Contractor's AHA and required by EM 385-1-1. Install personal protective grounds, with tags, to eliminate the potential for induced voltage in accordance with EM 385-1-1.

3.4.3 Lockout/Tagout Removal

Upon completion of work, conduct lockout/tagout removal procedure in accordance with the HECP. In accordance with EM 385-1-1, each lock and tag must be removed from each energy isolating device by the authorized individual or systems operator who applied the device. Provide formal notification to the Government (by completing the Government form if provided by Contracting Officer's Representative), confirming that steps of de-energization and lockout/tagout removal procedure have been conducted and certified through inspection and verification. Government or Utility locks and tags used to support the Contractor's work will not be removed until the authorized Government employee receives the formal notification.

3.5 FALL PROTECTION PROGRAM

Establish a fall protection program, for the protection of all employees exposed to fall hazards. Within the program include company policy, identify roles and 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 in accordance with EM 385-1-1.

3.5.1 Fall Protection Equipment and Systems

Enforce use of personal fall protection equipment and systems designated (to include fall arrest, restraint, and positioning) for each specific work activity in the Site Specific Fall Protection and Prevention Plan and 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.

Provide personal fall protection equipment, systems, subsystems, and components that comply with EM 385-1-1 and 29 CFR 1926.

3.5.1.1 Additional Personal Fall Protection Measures

In addition to the required fall protection systems, other protective measures such as safety skiffs, personal floatation devices, and life rings, are required when working above or next to water in accordance with EM 385-1-1. Personal fall protection systems and equipment are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall protection systems are required when operating other equipment such as scissor lifts. The need

for tying-off in such equipment is to prevent ejection of the employee from the equipment during raising, lowering, travel, or while performing work.

3.5.1.2 Personal Fall Protection Equipment

Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest body support device. The use of body belts is not acceptable. Harnesses must 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. Snap hooks and carabineers must be self-closing and self-locking, capable of being opened only by at least two consecutive deliberate actions and have a minimum gate strength of 3,600 lbs in all directions. Use webbing, straps, and ropes made of synthetic fiber. The maximum free fall distance when using fall arrest equipment must not exceed 6 feet, unless the proper energy absorbing lanyard is used. Always take into consideration the total fall distance and any swinging of the worker (pendulum-like motion), that can occur during a fall, when attaching a person to a fall arrest system. Equip all full body harnesses with Suspension Trauma Preventers such as stirrups, relief steps, or similar in order to provide short-term relief from the effects of orthostatic intolerance in accordance with EM 385-1-1.

3.6 USE OF EXPLOSIVES

Explosives must not be used or brought to the project site without prior written approval from the Contracting Officer. Such approval does not relieve the Contractor of responsibility for injury to persons or for damage to property due to blasting operations.

Storage of explosives, when permitted on Government property, must be only where directed and in approved storage facilities. These facilities must be kept locked at all times except for inspection, delivery, and withdrawal of explosives.

3.7 ELECTRICAL

Perform electrical work in accordance with EM 385-1-1.

3.7.1 Electrical Work

As described in EM 385-1-1, electrical work is to be conducted in a de-energized state unless there is no alternative method for accomplishing the work. In those cases obtain an energized work permit from the Contracting Officer. The energized work permit application must be accompanied by the AHA and a summary of why the equipment/circuit needs to be worked energized. 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. Attach temporary grounds in accordance with ASTM F855 and IEEE 1048. 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 is 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

are permitted to enter. When work requires work near energized circuits as defined by NFPA 70, high voltage personnel must use personal protective equipment that includes, as a minimum, electrical hard hat, safety footwear, insulating gloves and 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. Ensure that each employee is familiar with and complies with these procedures and 29 CFR 1910.

3.7.2 Qualifications

Electrical work must be performed by QP with verifiable credentials who are familiar with applicable code requirements. Verifiable credentials consist of State, National and Local Certifications or Licenses that a Master or Journeyman Electrician may hold, depending on work being performed, and must be identified in the appropriate AHA. Journeyman/Apprentice ratio must be in accordance with State, Local requirements applicable to where work is being performed.

3.7.3 Arc Flash

Conduct a hazard analysis/arc flash hazard analysis whenever work on or near energized parts greater than 50 volts is necessary, in accordance with NFPA 70E.

All personnel entering the identified arc flash protection boundary must be QPs and properly trained in NFPA 70E requirements and procedures. Unless permitted by NFPA 70E, no Unqualified Person is permitted to approach nearer than the Limited Approach Boundary of energized conductors and circuit parts. Training must be administered by an electrically qualified source and documented.

3.7.4 Grounding

Ground electrical circuits, equipment and enclosures in accordance with NFPA 70 and IEEE C2 to provide a permanent, continuous and effective path to ground unless otherwise noted by EM 385-1-1.

3.7.5 Testing

Temporary electrical distribution systems and devices must be inspected, tested and found acceptable for Ground-Fault Circuit Interrupter (GFCI) protection, polarity, ground continuity, and ground resistance before initial use, before use after modification and at least monthly. Monthly inspections and tests must be maintained for each temporary electrical distribution system, and signed by the electrical CP or QP.

-- End of Section --

SECTION 01 45 00

QUALITY CONTROL
08/23, CHG 3: 08/25

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 C1077	(2024) Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM D3666	(2016) Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
ASTM D3740	(2019) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E90	(2023) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
ASTM E329	(2023) Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection
ASTM E543	(2021) Standard Specification for Agencies Performing Non-Destructive Testing

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements
ER 1110-3-12	(2021) Military Engineering and Design Quality Management

U.S. DEPARTMENT OF DEFENSE (DOD)

FC 1-300-09N	(2024) Navy and Marine Corps Design

1.2 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program. Include all associated costs in the applicable Pricing Schedule item.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES.

SD-01 Preconstruction Submittals

Contractor Quality Control (CQC) Plan; G

Additional Requirements For Design Quality Control (DQC) Plan; G

SD-05 Design Data

Design Quality Control

Discipline-Specific Checklists

Design Quality Control Documentation (DQCD)

SD-06 Test Reports

Verification Statement

SD-07 Certificates

Certificate Of Readiness; G

1.4 GENERAL REQUIREMENTS

Establish and maintain an effective quality control (QC) system that complies with FAR 52.246-12 Inspection of Construction. QC is comprised of plans, procedures, and organization necessary to produce an end product that complies with the Contract requirements. The QC system covers all design and construction operations, both onsite and offsite, and must be keyed to the proposed design and construction sequence. The Quality Control Manager, Superintendent, Site Safety and Health Officer (SSHO), and all on-site supervisors are responsible for the quality of work and are subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the Contract. The Quality Control Manager must maintain a physical presence at the work site at all times and is the primary individual responsible for all quality control.

1.5 QUALITY CONTROL (QC) PROGRAM REQUIREMENTS

Establish and maintain a QC program as described in this section. This QC program is a key element in meeting the objectives of the Commissioning Process (Cx). The QC program consists of a QC Organization, QC Plan, QC Plan Meeting(s), a Coordination and Mutual Understanding Meeting, QC meetings, three phases of control, submittal review and approval, testing, completion inspections, QC certifications, independent Special Inspections in accordance with Section 01 45 35 SPECIAL INSPECTIONS, and documentation necessary to provide materials, equipment, workmanship, fabrication, construction and operations that comply with the requirements of this Contract. The QC program must cover on-site and off-site work and be keyed to the work sequence. No construction work or testing may be performed unless the QC Manager is on the work site. The QC Manager must

report to an officer of the firm and not be subordinate to the Project Superintendent or the Project Manager. The QC Manager, Project Superintendent and Project Manager must work together effectively. Although the QC Manager is the primary individual responsible for quality control, all individuals will be held responsible for the quality of work on the job.

1.5.1 Meetings

1.5.1.1 Quality Control Plan Meeting

Prior to submission of the QC Plan, the Contractor may request a meeting with the Contracting Officer to discuss the QC Plan requirements of this Contract.

The purpose of this meeting is to develop a mutual understanding of the QC Plan requirements prior to plan development and submission and to agree on the Contractor's list of Definable Feature of Work (DFOW).

1.5.1.2 Coordination and Mutual Understanding Meeting

After the Post Award Conference, before start of design or construction, and prior to acceptance by the Government of the CQC Plan, meet with the Contracting Officer and discuss the Contractor's quality control system. During the meeting, a mutual understanding of the system details must be developed, including the forms for recording the CQC operations, design activities, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting will be prepared by the QC Manager and signed by the Contractor, the Architect/Engineer (A/E), and the Government. Provide a copy of the signed minutes to all attendees and incorporate into the relevant QC Plan. At a minimum the Coordination and Mutual Understanding Meeting must be repeated when a new QC Manager is appointed. There can be other occasions when subsequent conferences will be called by either party to reconfirm mutual understandings or address deficiencies in the CQC system or procedures which can require corrective action by the Contractor.

1.5.1.2.1 Purpose

The purpose of this meeting is to develop a mutual understanding of the QC details, including documentation, administration for on-site and off-site work, design intent, Cx in accordance with Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING, environmental requirements and procedures, coordination of activities to be performed, Special Inspections, and the coordination of the Contractor's management, production, and QC personnel. At the meeting, the Contractor must explain in detail how three phases of control will be implemented for each DFOW, as well as how each DFOW will be affected by each management plan or requirement as listed below:

a. Waste Management Plan.

b. Procedures for noise and acoustics management.

c. Environmental Protection Plan.

d. Environmental regulatory requirements.

e. Cx Plan requirements in accordance with Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING.

f. Special Inspections.

g. Indoor Air Quality (IAQ) Management Plan.

1.5.1.2.2 Coordination of Activities

Coordinate activities included in various sections to assure efficient and orderly installation of each component. Coordinate operations included under different sections that are dependent on each other for proper installation and operation. Schedule construction operations with consideration for indoor air quality as specified in the IAQ Management Plan.Coordinate Special Inspections.

1.5.1.2.3 Attendees

As a minimum, the Contractor's personnel required to attend include an officer of the firm, the Project Manager, Project Superintendent, QC Manager, Alternate QC Manager, Assistant QC Manager, QC Specialists, Special Inspector, Special Inspector of Record, Commissioning Provider (CxC), and subcontractor representatives. Each subcontractor who will be assigned QC responsibilities must have a principal of the firm at the meeting.

1.5.1.3 Quality Control (QC) Meetings

After the start of construction, conduct weekly QC meetings led by the QC Manager at the work site with the Project Superintendent, the QC Specialists, the Special Inspector, the Special Inspector of Record, CxC, and the other personnel as necessary. The QC Manager is to prepare the minutes of the meeting and provide a copy to the Contracting Officer within 2 working days after the meeting. The Contracting Officer may attend these meetings. As a minimum, accomplish the following at each meeting:

a. Review the minutes of the previous meeting.

b. Review the schedule and the status of work and deficiencies/rework. Review the most current approved schedule (in accordance with schedule specification) and the status of work and deficiencies/rework.

c. Review the status of submittals and Request For Information (RFIs).

d. Review the work to be accomplished in the next 3 weeks as defined by the schedule section paragraph WEEKLY LOOK AHEAD in Section 01 32 17.00 20 COST-LOADED NETWORK ANALYSIS SCHEDULES (NAS) and all quality control documentation required for that work.

e. Review Testing Plan and Log including status of tests performed since last QC Meeting.

f. Resolve QC and production problems. Discuss status of pending change orders.

g. Address items that may require revising the QC Plan.

h. Review Accident Prevention Plan (APP) and effectiveness of the safety

program.

i. Review environmental requirements and procedures.

j. Review Environmental Management Plan.

k. Review Waste Management Plan.

l. Review the status of training completion.

m. Review Cx Plan and progress. Review Issues Log and resolution.

n. Review IAQ Management Plan.

1.5.2 Contractor Quality Control (CQC) Plan

Submit no later than 30 days after Contract Award, the CQC Plan proposed to implement the requirements FAR 52.246-12 Inspection of Construction. Design and Construction will be permitted to begin only after acceptance of the CQC Plan and other Contract requirements Design work is not permitted to start prior to approval of a Design Quality Control Plan.

1.5.2.1 Content of Contractor Quality Control (CQC) Plan

Provide a CQC Plan, prior to start of construction that includes a table of contents, with major sections identified, pages numbered sequentially, and that documents the proposed methods and responsibilities for accomplishing quality control during the construction of the project. The CQC Plan must at a minimum include the following sections:

a. A description of the quality control organization and acknowledgment that the CQC staff will implement the three phase control system for all aspects of the work specified.

b. An organizational chart showing the quality control organization with individual names and job titles and lines of authority up to an executive of the company at the home office.

c. NAMES AND QUALIFICATIONS: Names and qualifications, in resume format, (including position titles and durations for qualifying experiences) for each person in the QC organization. Include the Construction Quality Management (CQM) for Contractors course certifications for the QC personnel as required by the paragraph CONSTRUCTION QUALITY MANAGEMENT TRAINING.

d. DUTIES, RESPONSIBILITY AND AUTHORITY OF QC PERSONNEL: Duties, responsibilities, and authorities of each person in the QC organization.

e. OUTSIDE ORGANIZATIONS: A listing of outside organizations, such as architectural and consulting engineering firms, that will be employed by the Contractor and a description of the services these firms will provide.

f. APPOINTMENT LETTERS: Letters signed by an officer of the firm appointing the QC Manager and Alternate QC Manager, Design Quality Control Manager, CxC, and stating that they are responsible for implementing and managing the QC program as described in this Contract. Include in this letter the responsibility of the QC Manager

and Alternate QC Manager to implement and manage the three phases of control, and their authority to stop work that is not in compliance with the Contract. Letters of direction are to be issued by the QC Manager to the Assistant QC Manager and all other QC Specialists or quality control representatives outlining their duties, authorities, and responsibilities. Include copies of the letters in the QC Plan.

g. SUBMITTAL PROCEDURES AND INITIAL SUBMITTAL REGISTER: Procedures for reviewing, approving, scheduling, and managing submittals, including those of subcontractors, designers of record, consultants, architect-engineers (AE), offsite fabricators, suppliers, and purchasing agents. Provide the name(s) of the person(s) in the QC organization authorized to review and certify submittals prior to approval. Provide the initial submittal of the Submittal Register as specified in Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES.

h. TESTING LABORATORY INFORMATION: Testing laboratory information required by the paragraph ACCREDITATION REQUIREMENTS, as applicable.

i. TESTING PLAN AND LOG: A Testing Plan and Log that includes the tests required, associated feature of work required, referenced by the specification paragraph number requiring the test, the frequency, and the person responsible for each test.

j. Procedures to complete design and construction deficiencies from identification through acceptable corrective action. Establish verification procedures that identified deficiencies have been corrected. This phase is performed prior to beginning work on each definable feature of work, after all required plans, documents, materials are approved, and after copies are at the work site.

k. Reporting procedures, including proposed reporting formats.

l. Procedures for submitting and reviewing design changes/variations prior to submission to the Contracting Officer.

m. LIST OF DEFINABLE FEATURES: A Definable Feature of Work (DFOW) is a task that is separate and distinct from other tasks and has control requirements and work crews unique to that task. A DFOW is identified by different trades or disciplines, or it is work by the same trade in a different environment. A DFOW is by definition any item or activity on the construction schedule, and the schedule specification provides direction regarding how the DFOWs are to be structured. Include in the list of DFOWs for all activities on the Construction Schedule. Provide separate DFOWs in the Network Analysis Schedule for each design development stage and submittal package. Although each section of the specifications can generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section. Identify the specification section number and schedule activity ID for each DFOW listed. The DFOW list will be reviewed in coordination with the construction schedule and agreed upon during the Coordination and Mutual Understanding Meeting.

n. PROCEDURES FOR PERFORMING AND TRACKING THE THREE PHASES OF CONTROL: Identify procedures used to ensure the three phases of control to manage the quality on this project. For each Definable Feature of Work (DFOW), a Preparatory and Initial phase checklist will be filled out during the Preparatory and Initial phase meetings. Conduct the

Preparatory and Initial Phases and meetings with a view towards obtaining quality construction by planning ahead and identifying potential problems for each DFOW.

o. Coordinate scheduled work with Special Inspections required by Section 01 45 35 SPECIAL INSPECTIONS, the Statement of Special Inspections and the Special Inspections Project Manual. Where the applicable code issued by the International Code Council (ICC) calls for inspections by the Building Official, the Contractor must include the inspections in the Quality Control Plan and must perform the inspections required by the applicable ICC. The Contractor must perform these inspections using independent qualified inspectors. Include the Special Inspections Project Manual requirements in the QC Plan.

p. PROCEDURES FOR COMPLETION INSPECTION: Procedures for identifying and documenting the completion inspection process. Include in these procedures the responsible party for punch out inspection, pre-final inspection, and final acceptance inspection.

q. TRAINING PROCEDURES AND TRAINING LOG: Procedures for coordinating and documenting the training of personnel required by the Contract.

r. ORGANIZATION AND PERSONNEL CERTIFICATIONS LOG: Procedures for coordinating, tracking and documenting all certifications required for entities such as subcontractors, testing laboratories, suppliers, and personnel. The QC Manager will ensure that certifications are current, appropriate for the work being performed, and will not lapse during any period of the Contract that the work is being performed.

1.5.2.2 Additional Requirements for Design Quality Control (DQC) Plan

The following additional requirements apply to the DQC Plan:

a. Submit and maintain a DQC Plan as an effective quality control program which assures that all services required by this Contract are performed and provided in a manner that meets professional architectural and engineering quality standards. As a minimum, all documents must be technically reviewed by competent, independent reviewers identified in the DQC Plan. The same element that produced the product may not perform the Design Quality Control Review. Correct errors and deficiencies in the design documents prior to submitting them to the Government.

b. Include the design schedule in the master project schedule, showing the sequence of events involved in carrying out the project design tasks within the specific Contract period. Schedule must include sufficient detail to identify all major design tasks, including those that control the flow of work. Include review and correction periods associated with each item. Schedule must be a forward planning as well as a project monitoring tool. The schedule reflects calendar days and not dates for each activity. If the schedule is changed, submit a revised schedule reflecting the change within 7 calendar days.

c. Include in the DQC Plan the discipline-specific checklists to be used during the design and quality control of each submittal. Submit at each design phase as part of the project documentation these completed discipline-specific checklists. ER 1110-3-12 provides some useful information in developing checklists.

d. Implement the DQC Plan by a Design Quality Control Manager who has the responsibility of being cognizant of and assuring that all documents on the project have been coordinated and who coordinates work with and reports to the Contracting Officer via the QC Manager. Notify the Contracting Officer, in writing, of the name of the individual and the name of an alternate person assigned to the position.

e. Provide Quality Control Documentation procedures such as QC review sets and QC comments to demonstrate that cross checking of all engineering disciple's design drawings and specifications has taken place. The QC review documentation must exhibit a checking process of the design documents for completeness, accuracy, and constructability.

f. Names of the individuals, including their respective firm names, who will be serving as the Designer of Record (DOR) in their respective design discipline.

g. Submit a formal Communication Plan that indicates the frequency of design meetings and what information is covered in those meetings, key design decision points tied to the Network Analysis Schedule and how the DOR plans to include the Government in those decisions, peer review procedures, interdisciplinary coordination, design review procedures, and comment resolution.

The Communication Plan must 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 be written by the DQC Manager and confirmed during the Post Award Kick-off Partnering. Update the Communication Plan at every Partnering meeting.

h. A statement of Life Safety and Fire Protection Features Inspections and Testing must be prepared by the Fire Protection DOR. 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, through penetration firestop systems, spray-applied fireproofing of structural components, fire alarm and detection systems, fire suppression and standpipe systems, means of egress components, emergency and exit lighting fixtures. The plan must include a listing of the individuals, approved agencies or firms that will be retained for conducting the required inspections and tests accompanied by a description of individual inspector's experience, and a copy of all required certifications. Additional copies of this plan must be submitted to the NAVFAC Fire Protection Engineer and the Installation Fire Chief. This plan must include the following:

(1) Comprehensive list of systems, components or features to be inspected and tested.

(2) Description of performance verification testing activities for each system or component.

(3) Procedures and schedules for functional performance tests of all systems requiring functional testing.

i. Procedures for ensuring the design documents are submitted in accordance with FC 1-300-09N, Navy and Marine Corps Design Procedures and other procedures to ensure disciplines have been properly coordinated to eliminate conflicts.

1.5.3 Acceptance of the Quality Control (QC) and Design Quality Control (DQC) Plan

The Contracting Officer's acceptance of the Contractor QC Plan and Design Quality Control Plan is required prior to the start of design and construction. The Contracting Officer reserves the right to require changes in the QC and DQC Plan and operations as necessary, including removal or addition of personnel, to ensure the specified quality of work. The Contracting Officer reserves the right to interview any member of the QC and DQC organization at any time to verify the submitted qualifications. All QC and DQC organization personnel are subject to acceptance by the Contracting Officer. The Contracting Officer may require the removal of any individual for non-compliance with quality requirements specified in the Contract.

1.5.4 Preliminary Construction Work Authorized Prior to Acceptance

The only construction work that is authorized to proceed prior to the acceptance of the QC Plan is mobilization of storage and office trailers, temporary utilities, and surveying with specific prior approval of the Contracting Officer.

1.5.5 Notification of Changes

Notify the Contracting Officer, in writing, of any proposed changes in the QC Plan or changes to the QC organization personnel. Proposed changes are subject to acceptance by the Contracting Officer.

1.5.6 Special Inspections

Perform all required Special Inspections per Section 01 45 35 SPECIAL INSPECTIONS, the statement of Special Inspections and the Schedule of Special Inspections.

1.6 QUALITY CONTROL (QC) ORGANIZATION

1.6.1 Quality Control (QC) Manager

1.6.1.1 Duties

Provide a QC Manager at the work site to implement and manage the QC program, and to serve as the Level two Site Safety and Health Officer (SSHO) as detailed in Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS. The only duties and responsibilities of the QC Manager are to manage and implement the QC program on this Contract. The QC Manager must attend the partnering meetings, QC Plan Meetings, Coordination and Mutual Understanding Meeting, conduct the QC meetings, perform the three phases of control except for those phases of control designated to be performed by QC Specialists, perform submittal review and approval, ensure testing is performed and provide QC certifications and documentation required in

this Contract. The QC Manager is responsible for managing and coordinating the three phases of control and documentation performed by the QC Specialists, testing laboratory personnel and any other inspection and testing personnel required by this Contract. The QC Manager is the manager of all QC activities. The QC manager is responsible for notifying the Special Inspector and Special Inspector of Record of activities which require their review. The QC manager is responsible for coordinating the Special Inspection activities, see paragraph CONTRACTOR'S QUALITY CONTROL (QC) MANAGER, in Section 01 45 35 SPECIAL INSPECTIONS. The QC manager is responsible for the quality control for Sound Rated perimeter construction.

1.6.1.2 Qualifications

The QC Manager must possess at least a Bachelor's degree in engineering, architecture, or construction management, with a current professional engineer registration and a minimum of 10 years construction experience as a Project Superintendent, QC Manager, Project Manager, Project Engineer or Construction Manager on similar size and type construction Contracts which included the major trades that are part of this Contract. The individual must have at least 2 years experience as a QC Manager. The individual must be familiar with the requirements of EM 385-1-1 and have experience in the areas of hazard identification, safety compliance, and sustainability.

The QC Manager and all members of the QC organization must be capable of reading, writing, and conversing fluently in the English language.

1.6.1.3 Construction Quality Management Training

In addition to the above experience and education requirements, the QC Manager Alternate QC Manager, Superintendent, QC Specialist, and DQCM must have completed the CQM for Contractors course. If the QC Manager does not have a current certification, obtain the CQM for Contractors course certification within 90 days of award. This course is periodically offered by the Naval Facilities Engineering Systems Command and the Army Corps of Engineers. Contact the Contracting Officer for information on the next scheduled class.

The Construction Quality Management Training certificate expires after 5 years. If the QC Manager's certificate has expired, retake the course to remain current.

1.6.2 Organizational Changes

Maintain the QC staff with personnel as required by the specification section at all times. When it is necessary to make changes to the QC staff, revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

1.6.3 Design Quality Control (DQC) Manager

The DQC Manager must be a member of the QC organization, must coordinate actions with the QC Manager, and must not be subordinate to the Project Superintendent or the Project Manager.

1.6.3.1 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 a registered professional engineer or architect with an active registration. Provide proof of registration as part of the resume submittal package.

c. Complete the US Army Corps of Engineers (USACE) course entitled "Construction Quality Management (CQM) for Contractors."

1.6.3.2 Responsibilities

a. Be responsible for the design integrity, professional design standards, and all design services required.

b. Be a member of the DOR firm but may not be the DOR or the person stamping and approving final construction drawings or approving submittals.

c. Be responsible for development of the design portion of the QC Plan, incorporation and maintenance of the approved Design Schedule, and the preparation of DQC Reports 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 must 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.

g. Provide Design Quality Control Documentation (DQCD) which indicates design coordination of the engineering disciplines. Submit DQCD with the pre-final and final design submittals as required in Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES.

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

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 document the work the design team accomplished that week.

l. Coordinate all training requirements with the QC and in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA.

1.6.4 Alternate Quality Control (QC) Manager Duties and Qualifications

Designate an alternate for the QC Manager at the work site to serve in the event of the designated QC Manager's absence. The period of absence may not exceed 2 weeks at one time, and not more than 30 workdays during a calendar year. The qualification requirements for the Alternate QC Manager must be the same as for the QC Manager.

1.6.5 Assistant Quality Control (QC) Manager Duties and Qualifications

Provide a full-time assistant to the QC Manager at the work site to perform the three phases of control, perform submittal review, ensure testing is performed, and prepare QC certifications and documentation required by this Contract. The qualification requirements for the Assistant QC Manager must include a degree in architecture or engineering and at least 2 years of experience. The individual must be familiar with the requirements of EM 385-1-1 and have experience in the areas of hazard identification and safety compliance.

The Assistant QC Manager must be capable of reading, writing, and conversing fluently in the English language.

1.6.6 Designer of Record (DOR) Qualifications

The DOR must be a registered design professional, retained by the Prime Contractor, responsible for the overall design and review of submittal documents prepared by others. The DOR is registered or licensed to practice their respective design profession as defined by the statutory requirements of the professional registration laws in the state in which the design professional works. The DOR cannot serve as the DQC Manager.

1.6.7 Commissioning

Commissioning (Cx) is a systematic, quality-focused process for delivery of a project focusing on verifying and documenting all commissioned systems and assemblies are installed, tested, and operating as they were planned and designed to meet the project requirements. The Quality Control requirements outlined in this specification section are key in supporting the objectives of the Cx process, specifically coordinating testing, documenting, and verifying proper system operation. Properly executed the Quality Control support of Cx ensures timely execution of necessary tasks to deliver the fully commissioned and operating systems in coordination with the overall construction and project schedule.

Provide Cx in addition to the quality control requirements of this section and not as a substitute for quality control requirements. The QC Manager is responsible for carrying out the three phases of control while ensuring the functional performance and integrated systems tests are coordinated with the Cx provider as required for each system to be commissioned.

1.6.7.1 Certificate of Readiness

The QC Manager must issue a Certificate of Readiness for Government approval for each system to be commissioned. Schedule Functional Performance Tests for each system only after the Certificate of Readiness has been approved by the Government for the system. The Certificate of Readiness certifies that all required inspections have been completed and deficiencies that were identified through any prior review, inspection, or test activity have been corrected before the start of Functional Performance Tests. Refer to Cx requirements in Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING for a list of systems to be commissioned and detailed requirements for the Cx provider.

1.6.8 Quality Control (QC) Specialists

Provide a separate QC Specialist at the work site for each of the areas as

listed in the Matrix listed below, who must assist and report to the QC Manager and who must have no duties other than their assigned quality control duties. These individuals or specialized technical companies are directly employed by the Prime Contractor and cannot be employed by a supplier or subcontractor on this project. QC Specialists must be physically present at the work site with frequency as indicated in the Experience Matrix below, to participate in the QC Meetings, perform the three phases of control, including participation in Preparatory and Initial Phase meetings, and to perform and document Follow-up inspections as an extension of the QC Manager for each definable feature of work in their area of responsibility. QC Specialist must assist and be present for training events, and Critical System Acceptance inspections by the Government. Qualification, experience, Area of Responsibility, and frequency of QC surveillance are provided in Matrix listed herein.

Experience Matrix		
1. Area	**2-1. Qualification** **2-2. Experience**	**3-1. Area of Responsibility** **3-2. Frequency**
Civil	2-1. Graduate Civil Engineer or Construction Manager with a professional engineer registration, and 2-2. 2 years experience in the type of work being performed on this project or technician with 5 years related experience	3-2. Frequency of QC surveillance and inspection will be during installation and including final inspection.
Mechanical	2-1. Graduate Mechanical Engineer with a professional engineer registration, and 2-2. 2 years experience or person with 5 years of experience supervising mechanical features of work in the field with a construction company	3-2. Frequency of QC surveillance and inspection will be during installation and including final inspection.

Electrical	2-1. Graduate Electrical Engineer with a professional engineer registration, and 2-2. 2 years related experience or person 5 years of experience supervising electrical features of work in the field with a construction company	3-2. Frequency of QC surveillance and inspection will be during installation and including final inspection.
Structural	2-1. Graduate Civil Engineer (with Structural Track or Focus) or Construction Manager with a professional engineer registration, and 2-2. 2 years experience or person 5 years of experience supervising structural features of work in the field with a construction company	3-2. Frequency of QC surveillance and inspection will be during installation and including final inspection.
Architectural	2-1. Graduate Architect: registered architect, and 2-2. 2 years experience or person with 5 years related experience	3-2. Frequency of QC surveillance and inspection will be during installation and including final inspection.
Submittals	2-1. Submittal Clerk 2-2. 1 year experience	3-2. Frequency of QC surveillance and inspection will be during installation and including final inspection.
Concrete, Pavements and Soils	2-1. Materials Technician 2-2. 2 years experience for the appropriate area	3-2. Frequency of QC surveillance and inspection will be during installation and including final inspection.

Testing, Adjusting and Balancing (TAB) Personnel	2.1. TAB Team Field Leader must be a member of AABC or an experienced technician of the firm certified by the NEBB 2-2. 3 years experience immediately preceding this Contract	3-2. Frequency of QC surveillance and inspection will be during installation and including final inspection.
Roofing Manufacturer's Technical Representative	2-1. Installation and testing of roofing systems, Section B30 ROOFING 2-2. 5 years experience minimum	3-2. Frequency of QC surveillance and inspection will be during installation and including final inspection.
Fire Protection QC Specialist (FPQC)	Note: See paragraph FIRE PROTECTION QC SPECIALIST (FPQC)	Note: See paragraph FIRE PROTECTION QC SPECIALIST (FPQC)
Building Envelope QC Specialist	2-1. Roofing Manufacturer's Technical Representative 2-2. 5 years minimum with roofing system used	3-1. Area of Responsibility: Installation and testing of roofing. 3-2. Frequency of QC surveillance and inspection will be once a week during installation, once a week during flashing installation and full-time during roof testing.

1.6.8.1 Fire Protection QC Specialist (FPQC)

Provide a Fire Protection Quality Control Specialist (FPQC) within the QC organization to perform quality control related activities as specified herein on fire protection and life safety systems installed under this Contract.

1.6.8.1.1 Qualifications

The FPQC must have the following qualifications:

a. Be a registered Professional Engineer (P.E.) licensed by a Licensing Board in the United States, the District of Columbia, Guam or Puerto Rico, having passed the National Council of Examiners for Engineering and Surveying (NCEES) examination specifically in the discipline of Fire Protection Engineering.

b. Have a minimum of 5 years of Fire Protection Engineering experience on projects of similar relevance and complexity to the fire protection work specified under this Contract.

c. Other than the contractual obligations with the Prime Contractor, the

FPQC must have no other business relationship (i.e., employee, owner, partner, operating officer, distributor, salesman, technical representative, family relationship, or financial investment) with the Prime Contractor or subcontractors.

d. Be employed by an independent engineering firm or company or be the Fire Protection Engineer on the Prime Contractor's Design-Build team. The firm may identify multiple, to a maximum of five, licensed Fire Protection Engineers for the performance of the duties under this Contract but must submit the names and qualifications for Government approval for all individuals identified prior to them performing any work under this Contract. These individuals may not be substituted without prior approval from the Contracting Officer.

1.6.8.1.2 Responsibilities

FPQC duties and responsibilities:

a. Assist in the development of the QC Plan including the Testing Plan and Log and executing the three phases of control for work involving the installation and testing of fire protection and life safety systems as an extension of the QC Manager.

b. Participate in project QC Meetings. Participate in Preparatory and Initial Phase meetings and perform and Follow-up inspections for work involving the installation and testing of fire protection and life safety systems.

c. Review and certify that all submittals pertaining to fire protection and life safety systems are complete and accurate prior to submission to the Government for surveillance. Forward each submittal reviewed by the FPQC to the Government for surveillance within 10 working days of FPQC certification. The FPQC Specialist is responsible for ensuring submittals are complete and accurate and all corrections have been made prior to submission to the Government. The Government reserves the right to reject any submittal that has not first been reviewed and certified by the FPQC and so marked, in writing, attesting to such review and completeness of the submittal.

d. The Government reserves the right to reject any submittal or construction that is not in compliance to Contract. Government reviews do not relieve the Contractor responsibility for providing adequate quality control measures and do not constitute or imply acceptance of Contract variation.

e. Perform construction surveillance in accordance with the Schedule of Fire Protection System Inspections. Construction surveillance includes but is not limited to performing periodic on-site inspections during construction at specified milestones, performing a pre-final inspection of installed systems and witnessing functional testing; and participating and documenting in an on-site final acceptance inspection of fire protection and life safety systems with the Government FPE.

f. Document inspection results on a FPQC report prepared each day inspections are performed. The report must include a description of the visual inspection or observation performed, a written summary of findings, a conclusion on compliance with the Contract documents, and signature of the FPQC Specialist. In person inspection must be

documented via video (.mp4) or photo (.jpeg) or both. Video/photographic documentation must include before and after conditions and physical measurements. Forward the FPQC daily report to the QC Manager who must include the report with the submission of their daily QC Report to the Government each day. Every site visit by the FPQC must be documented on a FPQC daily report.

1.6.8.1.3 Schedule of Fire Protection System Inspections

A schedule, prepared by the Fire Protection DOR, which lists each of the required visual inspections and observations required by the FPQC. The schedule is included at the end of this UFGS section.

1.6.8.2 Quality Control (QC) for Sound Rated Perimeter Construction

1.6.8.2.1 Periodic (Follow-Up Phase) Inspections

Inspections must verify that construction and materials comply with the Contract documents, the description of the assembly in the ASTM E90 Factory Report for acoustical testing, and the approved submittals. Focus inspections on the construction of the sound rated assemblies, perimeter penetrations, and perimeter doors. Document periodic inspections in Daily QC Reports.

1.6.8.2.2 Preliminary Inspection

The Government and QC Manager will perform a joint preliminary inspection of the Sound Rated Area after construction of the assembly is complete to verify compliance with the design requirements and other Contract documents. The Contracting Officer will participate in the preliminary inspection. Provide the Contracting Officer a minimum 14 calendar days notification in advance of the preliminary inspection.

As a result of the preliminary inspection, prepare a Sound Rated Area punch list with deficiencies identified. Include with the punch list the estimated date by which the deficiencies will be corrected. Document the preliminary inspection in the Daily QC Report and attach the punch list. Notify the Contacting Officer when deficiencies are corrected. Deficiencies from the Preliminary Inspection must be corrected prior to scheduling the Final Acceptance Inspection.

1.6.8.2.3 Acceptance Testing for Sound Attenuation

Perform acceptance testing for sound transmission loss of sound rated door assemblies as required for sound rated assemblies. Acceptance testing must be performed during the preliminary inspection. The Contracting Officer must witness acceptance testing. Deficiencies identified during acceptance testing must be included in the Sound Rated Area punch list and corrected prior to the final acceptance inspection.

1.6.8.2.4 Final Inspection

Perform a final inspection of the Sound Rated Area after required testing has been successfully completed as part of the preliminary inspection and all punch list items corrected. Testing is not permitted during the final inspection. QC Manager and Superintendent must attend the final inspection and Government attendees will include the Contracting Officer. Request a final inspection by the Contracting Officer a minimum of 14 calendar days in advance.

1.6.9 Special Inspector and Special Inspector of Record

The Special Inspector (SI) and Special Inspector of Record (SIOR) must be an independent third party hired directly by the Prime Contractor. The SI and SIOR must not be a company employee of the Contractor or any subcontractor performing the work to be inspected. The qualifications of the SI and SIOR are defined in Section 01 45 35 SPECIAL INSPECTION.

1.6.10 Submittal Reviewer Duties and Qualifications

Each submittal must be reviewed by an individual with 10 years of construction experience.

1.7 SUBMITTAL AND DELIVERABLES REVIEW AND APPROVAL

Procedures for submission, review and approval of submittals are described in Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES. Procedures must include field verification of relevant dimensions and component characteristics by the QC organization prior to submittal being sent to the Contracting Officer. The CQC organization is responsible for certifying that all submittals and deliverables are in compliance with the Contract. When Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING are included in the Contract, the submittals required by those sections have to be coordinated with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES to ensure adequate time is allowed for each type of submittal required.

1.8 THREE PHASES OF CONTROL

CQC enables the Contractor to ensure that the construction, including that of subcontractors and suppliers, complies with the requirements of the Contract. At least three phases of control must be conducted by the QC Manager to adequately cover both on-site and off-site work for each definable feature of the construction work as follows:

1.8.1 Preparatory Phase

Document the results of the preparatory phase actions by separate minutes prepared by the QC Manager and attach to the daily CQC report. Instruct applicable workers as to the acceptable level of workmanship required to meet Contract specifications.

Notify the Contracting Officer at least 2 business days in advance of each preparatory phase meeting. The meeting will be conducted by the QC Manager and attended by the QC Specialists, the Project Superintendent, the CxC, the Special Inspector, the Special Inspector of Record, and the foreman responsible for the DFOW. When the DFOW will be accomplished by a subcontractor, that subcontractor's foreman must attend the preparatory phase meeting. This phase is performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. Perform the following prior to beginning work on each DFOW:

a. Review each paragraph of the applicable specification sections, reference codes, and standards. Make available during the prepatory inspection a copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the

field. Maintain and make available in the field for use by Government personnel until final acceptance of the work.

b. Review the Contract drawings.

c. Verify that field measurements are as indicated on construction or shop drawings or both before confirming product orders, to minimize waste due to excessive materials.

d. 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.

e. Review the testing plan and ensure that provisions have been made to provide the required QC testing.

f. Examine the work area to ensure that the required preliminary work has been completed and complies with the Contract and ensure any deficiencies/rework items in the preliminary work have been corrected and confirmed by the Contracting Officer.

g. Review coordination of product/material delivery to designated prepared areas to execute the work.

h. 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 and are properly stored.

i. Check to assure that all materials and equipment have been tested, submitted, and approved.

j. Discuss specific controls to be used, 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. Ensure any portion of the plan requiring separate Contracting Officer acceptance has been approved.

k. Review the APP and appropriate Activity Hazard Analysis (AHA) to ensure that applicable safety requirements are met, and that required Safety Data Sheets (SDS) are submitted.

l. Review the Cx requirements in accordance with Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING and ensure all preliminary work items have been completed and documented.

m. Review Special Inspections required by Section 01 45 35 SPECIAL INSPECTION, the Statement of Special Inspections and the Schedule of Special Inspections.

1.8.2 Initial Phase

Notify the Contracting Officer at least 2 business days in advance of each initial phase. When construction crews are ready to start work on a DFOW, conduct the initial phase with the QC Specialists, the Project Superintendent, the Special Inspector, the Special Inspector of Record, and the foreman responsible for that DFOW. 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 when acceptable levels of specified quality are not being met. Indicate the exact location of initial phase for definable feature of work for future reference and comparison with follow-up phases. Perform the following for each DFOW:

a. Check work to ensure that it is in full compliance with Contract requirements. Review minutes of the preparatory meeting.

b. Verify adequacy of controls to ensure full Contract compliance. Verify required control inspection and testing comply with the Contract.

c. Establish level of workmanship and verify that it meets the minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

d. Resolve any workmanship issues.

e. Ensure that testing is performed by the approved laboratory.

f. Check work procedures for compliance with the APP and the appropriate AHA to ensure that applicable safety requirements are met.

g. Review project specific work plans (i.e., Cx, HAZMAT Abatement, Stormwater Management) to ensure all preparatory work items have been completed and documented.

h. Coordinate scheduled work with Special Inspections required by Section 01 45 35 SPECIAL INSPECTIONS, the Statement of Special Inspections and the Schedule of Special Inspections.

1.8.3 Follow-Up Phase

Perform the following for on-going DFOW daily, or more frequently as necessary, until the completion of each DFOW. The Final Follow-Up for any DFOW will clearly note in the daily report the DFOW is completed, and all deficiencies/rework items have been completed in accordance with the paragraph DEFICIENCY/REWORK ITEMS LIST. Each DFOW that has completed the Initial Phase and has not completed the Final Follow-up must be included on each daily report. If no work was performed on that DFOW for the period of that daily report, it must be so noted. Document all Follow-Up activities for DFOWs in the daily CQC Report:

a. Ensure the work including control testing complies with Contract requirements until completion of that particular work feature. Record checks in the CQC documentation.

b. Maintain the quality of workmanship required.

c. Ensure that testing is performed by the approved laboratory.

d. Ensure that deficiencies/rework items are being corrected. Conduct final follow-up checks and correct all deficiencies prior to the start of additional features of work which may be affected by the deficient work.

e. Do not build upon nor conceal non-conforming work.

f. Assure manufacturers' representatives have performed necessary inspections if required and perform safety inspections.

g. Review the Cx requirements in accordance with Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING.

h. Coordinate scheduled work with Special Inspections required by Section 01 45 35 SPECIAL INSPECTIONS, the Statement of Special Inspections and the Schedule of Special Inspections.

1.8.4 Additional Preparatory and Initial Phases

Conduct additional preparatory and initial phases 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 has not started within 45 days of the initial preparatory meeting or has resumed after 45 days of inactivity, or if other problems develop.

1.8.5 Notification of Three Phases of Control for Off-Site Work

Notify the Contracting Officer at least 2 weeks prior to the start of the preparatory and initial phases.

1.8.6 Deficiency/Rework Items List

The QC Manager must maintain a list of work that does not comply with the Contract, identifying what items need to be corrected, the activity ID number associated with the item, the date the item was originally discovered, the date the item will be corrected by, and the date the item was corrected.

The QC Manager reviews the list at each weekly QC Meeting:

a. There is no requirement to report a deficiency/rework item that is corrected the same day it is discovered.

b. No successor task may be advanced beyond the preparatory phase meeting until all deficiencies/rework items have been cleared by the QC Manager and concurred with by the Contracting Officer. This must be confirmed as part of the Preparatory Phase activities.

c. Attach a copy of the "Deficiency/Rework Items List" to the last daily CQC Report of each month.

d. The Contractor is responsible for including those items identified by the Contracting Officer.

e. All deficiencies/rework items must be confirmed as corrected by the QC Manager, and concurred by the Contracting Officer, prior to commencement of any completion inspections per paragraph COMPLETION INSPECTIONS unless specifically exempted by the Contracting Officer.

f. Non-Compliance with these requirements is grounds for removal in accordance with paragraph ACCEPTANCE OF THE QUALITY CONTROL (QC) and DESIGN QUALITY CONTROL (DQC) PLAN.

g. All delays, concurrent or related to failure to manage, monitor, control, and correct deficiencies/rework items are entirely the

responsibility of the Contractor and can not be made the subject, or any component of any request for additional time or compensation.

1.9 TESTING

Perform specified or required tests to verify that control measures are adequate to provide a product which conforms to Contract requirements. Upon request, furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and acceptance tests when specified. Procure the services of an U.S. Army Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site. Perform the following activities and record and provide the following data:

a. Verify that testing procedures comply with Contract requirements.

b. Verify that facilities and testing equipment are available and comply with testing standards.

c. Check test instrument calibration data against certified standards.

d. Verify that recording forms and test identification control number system, including all test documentation requirements, have been prepared.

e. Record results of all tests taken, both passing and failing on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test. If approved by the Contracting Officer, actual test reports are submitted later with a reference to the test number and date taken. Provide an information copy of tests performed by an offsite or commercial test facility directly to the Contracting Officer. Failure to submit timely test reports as stated results in nonpayment for related work performed and disapproval of the test facility for this Contract.

1.9.1 Accreditation Requirements

Construction materials testing laboratories must be accredited by a laboratory accreditation authority and must submit a copy of the Certificate of Accreditation and Scope of Accreditation. The laboratory's scope of accreditation must include the appropriate ASTM standards (ASTM E329, ASTM C1077, ASTM D3666, ASTM D3740, ASTM E543) listed in the technical sections of the specifications. Laboratories engaged in Hazardous Materials Testing must meet the requirements of OSHA and EPA. The policy applies to the specific laboratory performing the actual testing, not just the Corporate Office.

1.9.2 Laboratory Accreditation Authorities

Laboratory Accreditation Authorities include the National Voluntary Laboratory Accreditation Program (NVLAP) administered by the National Institute of Standards and Technology at https://www.nist.gov/nvlap, the American Association of State Highway and Transportation Officials (AASHTO) Accreditation Program at http://www.aashtoresource.org/aap/overview, International Accreditation Services, Inc. (IAS) at https://www.iasonline.org/, U.S. Army Corps of Engineers Materials Testing Center (MTC) at https://www.erdc.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/476661/materials-testing-center/, the

American Association for Laboratory Accreditation (A2LA) program at https://a2la.org/, the Washington Association of Building Officials (WABO) at https://www.wabo.org/ (Approval authority for WABO is limited to projects within Washington State), and the Washington Area Council of Engineering Laboratories (WACEL) at https://www.wacel.org/lab-accreditation-and-inspection-agency-audit-programs/laboratory-accreditation-program/(Approval authority by WACEL is limited to projects within Facilities Engineering Command (FEC) Washington geographical area).

1.9.3 Capability Check

The Contracting Officer retains the right to check laboratory equipment in the proposed laboratory and the laboratory technician's testing procedures, techniques, and other items pertinent to testing, for compliance with the standards set forth in this Contract. Laboratories utilized for testing soils, concrete, asphalt, and steel must meet criteria detailed in ASTM D3740 and ASTM E329.

1.9.4 Test Results

Cite applicable Contract requirements, tests or analytical procedures used. Provide actual results and include a statement that the item tested or analyzed conforms or fails to conform to specified requirements. If the item fails to conform, notify the Contracting Officer immediately. Conspicuously stamp the cover sheet for each report in large red letters "CONFORMS" or "DOES NOT CONFORM" to the specification requirements, whichever is applicable. Test results must be signed by a testing laboratory representative authorized to sign certified test reports. Furnish the signed reports, certifications, and other documentation to the Contracting Officer via the QC Manager. Furnish a summary report of field tests at the end of each month, in accordance with paragraph DOCUMENTATION AND INFORMATION FOR THE CONTRACTING OFFICER.

1.9.5 Test Reports and Monthly Summary Report of Tests

Furnish the signed reports, certifications, and a summary report of field tests at the end of each month to the Contracting Officer. Attach a copy of the summary report to the last daily CQC Report of each month. Provide a copy of the signed test reports and certifications to the Operation and Maintenance Support Information (OMSI) preparer for inclusion into the OMSI documentation, in accordance with Sections 01 78 23 OPERATION AND MAINTENANCE DATA and 01 78 24.00 20 FACILITY DATA WORKBOOK (FDW).

1.10 COMPLETION INSPECTIONS

1.10.1 Punch-Out Inspection

Near the completion of all work or any increment thereof, established by a completion time stated in the Contract Clause entitled "Commencement, Prosecution, and Completion of Work," or stated elsewhere in the specifications, the QC Manager must conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved drawings, specifications, and Contract. Include in the punch list any remaining items on the "Deficiency/Rework Items List", that were not corrected prior to the Punch-Out Inspection as approved by the Contracting Officer in accordance with the paragraph DEFICIENCY/REWORK ITEMS LIST. Include within the punch list the estimated date by which the deficiencies will be corrected. Provide a copy of the punch list to the Contracting

Officer.

The QC Manager, or staff, must make follow-on inspections to ascertain that all deficiencies have been corrected. All punch list items must be confirmed as corrected by the QC Manager and concurred by the Contracting Officer. Once this is accomplished, notify the Government that the facility is ready for the Government "Pre-Final Inspection".

1.10.2 Pre-Final Inspection

The Government and QC Manager will perform this inspection to verify that the facility is complete and ready to be occupied. A Government "Pre-Final Punch List" will be documented by the QC Manager as a result of this inspection. The QC Manager will ensure that all items on this list are corrected and concurred by the Contracting Officer prior to notifying the Government that a "Final" inspection with the Client can be scheduled. All items noted on the "Pre-Final" inspection must be corrected and concurred by the Contracting Officer in a timely manner and be accomplished before the Contract completion date for the work, or any increment thereof, if the project is divided into increments by separate completion dates unless exceptions are directed by the Contracting Officer.

1.10.3 Final Acceptance Inspection

Notify the Contracting Officer at least 14 calendar days prior to the date a final acceptance inspection can be held. State within the notice that all items previously identified on the pre-final punch list will be corrected and acceptable, along with any other unfinished Contract work, by the date of the final acceptance inspection. The Contractor must be represented by the QC Manager, the Project Superintendent, and others deemed necessary. Attendees for the Government will include the Contracting Officer, other Government QA personnel, and personnel representing the Client. Failure of the Contractor to have all Contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the Contract Clause entitled "Inspection of Construction."

1.11 QUALITY CONTROL (QC) CERTIFICATIONS

1.11.1 Contractor Quality Control (CQC) Report Certification

Contain the following statement within the CQC Report: "On behalf of the Contractor, I certify that this report is complete and correct and equipment and material used, and work performed during this reporting period is in compliance with the Contract drawings and specifications to the best of my knowledge, except as noted in this report."

1.11.2 Completion Certification

Upon completion of work under this Contract, the QC Manager must furnish a certificate to the Contracting Officer attesting that "the work has been completed, inspected, tested and is in compliance with the Contract." Provide a copy of this final QC Certification for completion to the preparer of the Operation & Maintenance (O&M) documentation.

1.11.3 Invoice Certification

Furnish a certificate to the Contracting Officer with each payment

request, signed by the QC Manager, attesting that as-built drawings are current, coordinated and attesting that the work for which payment is requested, including stored material, complies with Contract requirements.

1.12 DOCUMENTATION AND INFORMATION FOR THE CONTRACTING OFFICER

1.12.1 Construction Documentation

Prepare a Construction Production Report and a Contractor Quality Control Report for each day that work is performed. Attach the Construction Production Report to the Contractor Quality Control Report prepared for the same day. Maintain current and complete records of on-site and off-site QC program operations and activities.
Account for each calendar day throughout the life of the Contract.

The Project Superintendent and the QC Manager must prepare and sign the Contractor Production and CQC Reports, respectively. Every space on the forms must be filled in. Use N/A if nothing can be reported in one of the spaces. The reporting of work must be identified by terminology consistent with the construction schedule. In the "Remarks" sections of the reports, enter pertinent information including directions received, problems encountered during construction, work progress and delays, conflicts or errors in the drawings or specifications, field changes, safety hazards encountered, instructions given and corrective actions taken, delays encountered, a record of visitors to the work site, quality control problem areas, deviations from the QC Plan, construction deficiencies encountered, and meetings held. For each entry in the report(s), identify the Schedule Activity No. that is associated with the entered remark.

1.12.2 Quality Control Activities

CQC and Contractor Production reports will be prepared daily to maintain current records providing factual evidence that required quality control activities and tests have been performed. Include in these records the work of subcontractors and suppliers on an acceptable form that includes, as a minimum, the following information:

a. The name and area of responsibility of the Contractors and any subcontractors.

b. Operating plant/equipment with hours worked, idle, or down for repair.

c. Work performed each day, giving location, description, and by whom. When a Network Analysis Schedule (NAS) is used, identify each item of work performed each day by NAS activity number.

d. Control phase activities performed. Preparatory, and Initial phase Checklists associated with the DFOW referenced to the construction schedule. Follow-up phase activities identified to the DFOW. If testing or specific QC Specialist activities are associated with the Follow-up phase activities for a specific DFOW note this and include those reports.

e. Test and control activities performed with results and references to specifications and drawings requirements. Identify the control phase (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action in accordance with the paragraph DEFICIENCY/REWORK ITEMS LIST.

f. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications and drawings requirements.

g. Submittals and deliverables reviewed, with Contract reference, by whom, and action taken.

h. Offsite surveillance activities, including actions taken.

i. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

j. Instructions given/received and conflicts in plans and specifications.

k. Provide documentation of design quality control activities. For independent design reviews, provide, as a minimum, identification of the Design Quality Control Review team and their review comments, responses and the record of resolution of the comments.

1.12.3 Verification Statement

Indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. Cover both conforming and deficient features and include a statement that equipment and materials incorporated in the work and workmanship comply with the Contract.

Furnish the original and one copy of these records in report form to the Government by 10:00 AM the next working day after the date covered by the report. As a minimum, prepare and submit one report for every 7 days of no work and on the last day of a no work period. All calendar days need to be accounted for throughout the life of the Contract. The first report following a day of no work will be for that day only. Reports need to be signed and dated by the QC Manager. Include copies of test reports and copies of reports prepared by all subordinate quality control personnel within the QC Manager Report.

1.12.4 Reports from the Quality Control (QC) Specialist(s)

Document inspection results on a QC specialist report prepared each day work is performed in their area of responsibility. The report must include a description of the visual inspection or observation performed, a written summary of findings, a conclusion on compliance with the Contract documents, and signature of the QC Specialist. In person inspections must be documented with Video/photographs. Video/photographic documentation of deficiencies must include before and after conditions and physical measurements, as necessary. Forward the QC daily report to the QC Manager who must include the report with the submission of their daily QC Report to the Government each day. Every site visit by the QC Specialist must be documented on a QC Specialist daily report.

1.12.5 Quality Control Validation

Establish and maintain the following in an electronic folder. Divide folder into a series of tabbed sections as shown below. Ensure folder is updated at each required progress meeting.

a. CQC Meeting minutes in accordance with paragraph QUALITY CONTROL (QC)

MEETINGS.

b. All completed Preparatory and Initial Phase Checklists, arranged by specification section, further sorted by DFOW referenced to the construction schedule. Submit each individual Phase Checklist the day the phase event occurs as part of the CQC daily report.

c. All milestone inspections, arranged by Activity Number referenced to the construction schedule.

d. An up-to-date copy of the Testing Plan and Log with supporting field test reports, arranged by specification section referenced to the DFOW to which individual reports results are associated. Individual field test reports will be submitted within 2 working days after the test is performed in accordance with the paragraph QUALITY CONTROL ACTIVITIES. Monthly Summary Report of Tests: Submit the report as an electronic attachment to the CQC Report at the end of each month.

e. Copies of all Contract modifications, arranged in numerical order. Also include documentation that modified work was accomplished.

f. An up-to-date copy of the paragraph DEFICIENCY/REWORK ITEMS LIST.

g. Cx documentation in accordance with Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING.

h. Special Inspection reports.

i. Upon commencement of Completion Inspections of the entire project or any defined portion, maintain up-to-date copies of all punch lists issued by the QC staff to the Contractor and subcontractors and all punch lists issued by the Government in accordance with the paragraph COMPLETION INSPECTIONS.

1.12.6 Testing Plan and Log

As tests are performed, the CxC and the QC Manager will record on the "Testing Plan and Log" the date the test was performed and the date the test results were forwarded to the Contracting Officer. Attach a copy of the updated "Testing Plan and Log" to the last daily CQC Report of each month. Provide a copy of the final "Testing Plan and Log" to the preparer of the Operation & Maintenance (O&M) documentation.

1.12.7 As-Built Drawings

The QC Manager must ensure the as-built drawings, required by Section 01 78 00 CLOSEOUT SUBMITTALS are kept current on a daily basis and marked to show deviations which have been made from the Contract drawings. The as-built drawings document commences with the QC Manager ensuring all amendments, or changes to the Contract prior to Contract award are accurately noted in the initial document set creating the accurate baseline of the Contract prior to any work starting. Ensure each deviation has been identified with the appropriate modifying documentation (e.g., PC No., Modification No., Request for Information No.). The QC Manager or QC Specialist assigned to an area of responsibility must initial each revision. Upon completion of work, the QC Manager will furnish a certificate attesting to the accuracy of the as-built drawings prior to submission to the Contracting Officer.

1.13 NOTIFICATION ON NON-COMPLIANCE

The Contracting Officer will notify the Contractor of any detected non-compliance with the Contract. Take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, is deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders will be made the subject of a claim for extension of time for excess costs or damages by the Contractor.

1.14 DELIVERY, STORAGE, AND HANDLING

Designate receiving/storage areas for incoming material to be delivered according to installation schedule and to be placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. Store and handle materials in a manner as to prevent loss from weather and other damage. Keep materials, products, and accessories covered and off the ground, and store in a dry, secure area. Prevent contact with material that may cause corrosion, discoloration, or staining. Protect all materials and installations from damage by the activities of other trades.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SCHEDULE OF FIRE PROTECTION SYSTEM INSPECTIONS BY FPQC SPECIALIST

1. INSTRUCTIONS for FPQC Specialist:

Perform surveillance of fire protection system installation during construction and during pre-final and final acceptance inspections. Surveillance includes either visual inspections or observations performed by the FPQC as indicated in the following Schedule of Fire Protection System Inspections. Check boxes in the schedule indicate the inspections or observations that are applicable to this project, which must be performed and documented by the FPQC.

Surveillance of fire protection system inspections is divided into three phases:

Surveillance During Construction – Includes periodic on-site visits by the FPQC during construction

Pre-Final Acceptance Inspection – FPQC must be onsite during pre-final acceptance inspection

Final Acceptance inspection – FPQC must be onsite during final acceptance inspection

2. INSPECTION TYPE

VISUAL INSPECTION:

Perform on-site visual inspections as indicated in the Schedule of Fire Protection System Inspections as construction progresses to confirm work conforms with the contract requirements including but not limited to verifying proper installation of equipment and materials in accordance with applicable codes. Where work will be covered up by finished walls and ceilings, inspections must be scheduled and performed when work is still visible.

OBSERVATION:

Observe component and system testing in person on-site as indicated in the Schedule of Fire Protection System Inspections. Confirm testing is completed in accordance with applicable codes and that testing was successful.

DOCUMENTATION:

Document all inspections and observations in the FPQC Report in accordance with UFGS 01 45 00. Document any deficiencies and all work observed that has been successfully performed in accordance with the contract documents. Record deficiencies in the rework list.

SCHEDULE OF FIRE PROTECTION SYSTEM INSPECTIONS BY FPQC SPECIALIST

PERFORM SURVEILLANCE DURING CONSTRUCTION

~ FIRE SUPPRESSION SYSTEM ~

PERFORM TASK IF CHECKED	TASK	INSPECTION TYPE	DESCRIPTION
☒	1. Verify proper installation of underground service main and service; laterals, thrust blocks, tie-rods and connection to above ground piping.	**VISUAL INSPECTION**	✓ Visually inspect materials ✓ Visually inspect installation
☒	2. Verify proper orientation of fire hydrants and fire department access	**VISUAL INSPECTION**	✓ Visually inspect installation and orientation
☒	3. Verify proper installation of interior and exterior attachments, coatings, and vortex plate prior to filling fire protection water tank (if required)	**VISUAL INSPECTION**	✓ Visually inspect fire protection water tank installation
☒	4. Hydrostatic/leak test for underground piping (if underground system work is required)	**OBSERVE**	✓ Verify proper test method ✓ Confirm test was successful
☒	5. Hydrostatic/leak test for above ground piping prior to ceiling installation	**OBSERVE**	✓ Verify proper test method ✓ Confirm test was successful
☒	6. Underground system flush prior to connection to the riser (if underground system work is required)	**OBSERVE**	✓ Verify system was properly flushed
☒	7. Forward flow test for Backflow preventer	**OBSERVE**	✓ Verify proper test method ✓ Confirm test was successful
☒	8. Suction pipe flush prior to fire pump startup (if fire pump is required)	**OBSERVE**	✓ Verify system was properly flushed
☒	9. Hydrostatic test fire pump suction and discharge piping (if fire pump is required)	**OBSERVE**	✓ Verify proper test method ✓ Confirm test was successful
☒	10. Fire pump startup (if fire pump is required)	**OBSERVE**	✓ Confirm successful startup
☒	11. Verify proper installation of sprinkler piping prior to wall or ceiling installation	**VISUAL INSPECTION**	✓ Inspect pipe hangars, bracing, sprinkler heads ✓ Inspect for sprinkler obstructions; damaged, painted or covered heads ✓ Verify proper location of control valves, drains, vents, backflow, test header ✓ Verify proper component mounting heights
☒	12. Document inspections and observations in FPQC Report	**DOCUMENT**	✓ Submit report for each day inspections or observations occur

SCHEDULE OF FIRE PROTECTION SYSTEM INSPECTIONS BY FPQC SPECIALIST

			✓ Annotate deficiencies and satisfactory work observed ✓ Record rework items in FPQC report
~ SPECIAL FIRE SUPPRESSION SYSTEM ~			
PERFORM TASK IF CHECKED	TASK	INSPECTION TYPE	DESCRIPTION
☐	1. Verify proper installation of gaseous fire suppression system	**VISUAL INSPECTION**	✓ Inspect gas cylinders, initiating controls, shutdowns, aborts, and visual warning
☐	2. Verify proper installation of IR hangar detector	**VISUAL INSPECTION**	✓ Inspect detector and nozzle layout ✓ Inspect for obstructions, abort stations ✓ Inspect riser piping
☒	3. Verify proper installation of elevator fire protection	**VISUAL INSPECTION**	✓ Inspect elevator recall functions ✓ Inspect two-way communication
☒	4. Verify proper installation of fire suppression in secure spaces (if applicable)	**VISUAL INSPECTION**	✓ Inspect location of sprinkler piping and sprinklers
☐	5. Document inspections and observations in FPQC Report	**DOCUMENT**	✓ Submit report for each day inspections or observations occur ✓ Document deficiencies and satisfactory work observed in FPQC Report ✓ Record deficiencies in rework list
~ PASSIVE FIRE PROTECTION SYSTEMS ~			
PERFORM TASK IF CHECKED	TASK	INSPECTION TYPE	DESCRIPTION
☒	1. Verify proper construction of fire rated assemblies	**VISUAL INSPECTION**	✓ Inspect partitions for proper fire rated construction per design ✓ Inspect doors and door hardware for proper fire rating ✓ Inspect glass for proper fire rating
☒	2. Verify proper installation of fireproofing (if fireproofing is required)	**VISUAL INSPECTION**	✓ Inspect for use of proper fireproofing materials ✓ Inspect for cracking, spalling or delaminating ✓ Inspect for proper application thickness
☒	3. Verify proper installation of firestopping	**VISUAL INSPECTION**	✓ Inspect to confirm firestopping system is UL tested or an engineering judgement has been obtained and submitted ✓ Inspect for use of proper firestopping materials

SCHEDULE OF FIRE PROTECTION SYSTEM INSPECTIONS BY FPQC SPECIALIST

			✓ Inspect penetrations through fire rated walls, partitions and ceilings ✓ Inspect construction joints and gaps
☒	4. Document inspections and observations in FPQC Report	**DOCUMENT**	✓ Submit report for each day inspections or observations occur ✓ Document deficiencies and satisfactory work observed in FPQC Report ✓ Record deficiencies in rework list

~ FIRE ALARM SYSTEMS ~

PERFORM TASK IF CHECKED	TASK	INSPECTION TYPE	DESCRIPTION
☒	1. Verify proper installation of fire alarm system after conduit is installed and wiring pulled, but before devices are installed	**VISUAL INSPECTION**	✓ Inspect conduit, wiring, conduit fill, wire type ✓ Inspect installation heights of back boxes
☒	2. Document inspections and observations in FPQC Report	**DOCUMENT**	✓ Submit report for each day inspections or observations occur ✓ Document deficiencies and satisfactory work observed in FPQC Report ✓ Record deficiencies in rework list

~ END OF SURVEILLANCE DURING CONSTRUCTION SECTION

PERFORM DURING PRE-FINAL ACCEPTANCE INSPECTION

PERFORM TASK IF CHECKED	TASK	INSPECTION TYPE	DESCRIPTION
☒	1. Inspect all fire protection systems and all life safety features	**VISUAL INSPECTION**	✓ Verify proper installation of fire protection and life safety systems
☒	2. Witness functional testing of all fire protection and life safety systems	**OBSERVE**	✓ Verify proper testing is performed on fire protection and life safety systems
☒	3. Identify deficiencies that require correction	**VISUAL INSPECTION**	✓ Document deficiencies in FPQC Report and record in rework list
☒	4. Verify rework items have been corrected	**VISUAL INSPECTION**	✓ Record re-inspection results on FPQC Report
☒	5. Document results of pre-final inspection and photograph unsatisfactory conditions	**DOCUMENT**	✓ Document results of pre-final inspection in FPQC Report
☒	6. Certify installation and operation of all fire protection and life safety systems conform to the contract documents	**DOCUMENT**	✓ Provide separate letter certifying conformance with contract requirements

~ END OF PRE-FINAL INSPECTION SECTION

SCHEDULE OF FIRE PROTECTION SYSTEM INSPECTIONS BY FPQC SPECIALIST

PERFORM DURING FINAL ACCEPTANCE INSPECTION

PERFORM TASK IF CHECKED	TASK	INSPECTION TYPE	DESCRIPTION
☒	1. Verify proper installation and operation of all fire protection systems and all life safety features	**VISUAL INSPECTION**	✓
☒	2. Note any deficiencies identified by Government FPE on deficiency list	**DOCUMENT**	✓ Document deficiencies identified by Government FPE on deficiency list
☒	3. Verify all deficiencies have been corrected	**VISUAL INSPECTION**	✓ Inspect rework to confirm all deficiencies have been corrected
☒	4. Certify that all deficiencies have been corrected	**DOCUMENT**	✓ Document inspection results on FPQC Report

~ END OF FINAL ACCEPTANCE INSPECTION SECTION

SECTION 01 45 35

SPECIAL INSPECTIONS
05/24

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 SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7-22	(2022; Supp 1 2023; Supp 2 2023) Minimum Design Loads and Associated Criteria for Buildings and Other Structures

INTERNATIONAL CODE COUNCIL (ICC)

ICC IBC	(2024) International Building Code

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 3-301-01	(2023; with Change 3, 2025) Structural Engineering
UFC 3-301-02	(2023; with Change 1, 2025) Design of Risk Category V Structures, National Strategic Military Assets

1.2 GENERAL REQUIREMENTS

Perform Special Inspections in accordance with the Statement of Special Inspections, Schedule of Special Inspections, Chapter 17 of ICC IBC, and UFC 3-301-01. The Statement of Special Inspections and Schedule of Special Inspections are included as an attachment to this specification. Special Inspections are to be performed by an independent third party and are intended to ensure that the work of the Prime Contractor is in accordance with the Contract Documents and applicable building codes. Special inspections do not take the place of the three phases of control inspections performed by the Contractor's QC Manager or any testing and inspections required by other sections of the specifications.

Structural observations will be performed by the Structural Engineer of Record (SER). The Contractor must provide notification to the Contracting Officer and Structural Engineer of Record (SER) 14 days prior to the following points of construction to allow for structural observation:

a. After reinforcing placement is complete and before placement of concrete for the first significant concrete pour.

b. After completion of critical connections such as those designed to accommodate expansion and contraction.

c. Points of Construction required by the Structural Engineer of Record (SER).

1.3 DEFINITIONS

1.3.1 Continuous Special Inspections

Continuous Special Inspections is the constant monitoring of specific tasks by a special inspector. These inspections must be carried out continuously over the duration of the particular tasks.

1.3.2 Perform

Perform these tasks for each weld, fastener or bolted connection, and noted required verification.

1.3.3 Observe

Observe these items randomly during the course of each work day to insure that applicable requirements are being met. Observe these Special Inspections items on a periodic daily basis. Operations need not be delayed pending these inspections.

1.3.4 Special Inspector (SI)

A qualified person retained by the Contractor and approved by the Contracting Officer as having the competence necessary to inspect a particular type of construction requiring Special Inspections. The SI must be an independent third party hired directly by the Prime Contractor.

1.3.5 Associate Special Inspector (ASI)

A qualified person who assists the SI in performing Special Inspections but who must perform inspection under the direct supervision of the SI and who cannot perform inspections without the SI on site.

1.3.6 Third Party

A Special inspector must not be an employee of the Contractor or of any Sub-Contractor performing the work to be inspected.

1.3.7 Special Inspector of Record (SIOR)

A licensed professional engineer in responsible charge of supervision of all special inspectors for the project and approved by the Contracting Officer. The SIOR must be an independent third-party entity hired directly by the Prime Contractor.

1.3.8 Contracting Officer

The Government official having overall authority for administrative contracting actions. Certain contracting actions may be delegated to the Contracting Officer's Representative (COR).

1.3.9 Quality Control (QC) Manager

An individual retained by the Prime Contractor and qualified in accordance with the Section 01 45 00 QUALITY CONTROL having the overall responsibility for the Contractor's QC organization.

1.3.10 Structural Engineer of Record (SER)

A registered design professional retained by the Prime Contractor responsible for the overall design and review of submittal documents prepared by others. The SER is registered or licensed to practice their respective design profession as defined by the statutory requirements of the professional registration laws in the state in which the design professional works. The SER is also referred to as the Engineer of Record (EOR) in design documents.

1.3.11 Statement of Special Inspections (SSI)

A document developed by the SER identifying the materials, systems, components and work required to have Special Inspections.

1.3.12 Schedule of Special Inspections (SSI)

A schedule developed by the SER which lists each of the required Special Inspections, the extent to which each Special Inspection is to be performed, and the required frequency for each in accordance with ICC IBC Chapter 17.

1.3.13 Designated Seismic Systems (DSS)

Those nonstructural components that require design in accordance with ASCE 7-22 Chapter 13 and for which the component importance factor, Ip, is greater than 1.0. This designation applies to systems that are required to be operational following the Design Earthquake for RC I - IV structures and following the MCER for RC V structures. All systems in RC V facilities designated as MC-1 in accordance with UFC 3-301-02 are considered part of the Designated Seismic Systems.

1.3.14 Definable Feature of Work (DFOW)

An inspection group that is separate and distinct from other inspection groups, having inspection requirements or inspectors that are unique.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

SIOR Letter of Acceptance; G

Special Inspections Project Manual; G

Special Inspections Agency's Written NDT Practices with method and evidence of regular equipment calibration where applicable

SD-06 Test Reports

Special Inspection Daily Reports

Special Inspection Biweekly Reports

SD-07 Certificates

AISC Certified Steel Fabricator

Steel Truss Plant Quality Assurance Program

Wood Truss Plant Quality Assurance Program

AC472 Accreditation

Precast Concrete Institute (PCI) Certified Plant

Certificate of Compliance

Special Inspector of Record Qualifications; G

Special Inspector Qualifications; G

Qualification Records for Nondestructive Testing Technicians

SD-11 Closeout Submittals

Interim Report of Special Inspections from each DFOW; G

Comprehensive Final Report of Special Inspections; G

Final Report of Structural Observations where required; G

1.5 SPECIAL INSPECTOR QUALIFICATIONS

Submit qualifications for each special inspector and the special inspector of record according to the following certification requirements. The Government will consider alternate equivalent certification upon request. Without written acceptance deviations to the following qualifications are not approved.

1.5.1 Steel Construction and High Strength Bolting

1.5.1.1 Special Inspector

a. ICC Structural Steel and Bolting Special Inspector certificate with one year of related experience, or

b. Registered Professional Engineer with 3 years of related experience

1.5.1.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

1.5.2 Welding Structural Steel

1.5.2.1 Special Inspector

a. ICC Structural Welding Special Inspector certificate with one year of related experience, or

b. AWS Certified Welding Inspector

1.5.2.2 Associate Special Inspector

AWS Certified Associate Welding Inspector

1.5.3 Nondestructive Testing of Welds

1.5.3.1 Special Inspector

NDT Level III Certificate

1.5.3.2 Associate Special Inspector

NDT Level II Certificate plus one year of related experience

1.5.4 Cold Formed Steel Framing

1.5.4.1 Special Inspector

a. ICC Structural Steel and Bolting Special Inspector certificate with one year of related experience, or

b. ICC Commercial Building Inspector with one year of experience, or

c. Registered Professional Engineer with 3 years related experience

1.5.4.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

1.5.5 Concrete Construction

1.5.5.1 Special Inspector

a. ICC Reinforced Concrete Special Inspector Certificate with one year of related experience, or

b. ACI Concrete Construction Special Inspector, or

c. Registered Professional Engineer with 3 years of related experience

1.5.5.2 Associate Special Inspector

a. ACI Concrete Construction Special Inspector-in-Training, or

b. Engineer-In-Training with one year of related experience

1.5.6 Prestressed Concrete Construction

1.5.6.1 Special Inspector

a. ICC Prestressed Concrete Special Inspector Certificate with one year of related experience, or

b. PCI Quality Control Technician/Inspector Level II Certificate with one year of related experience, or

c. Registered Professional Engineer with 3 years of related experience

1.5.6.2 Associate Special Inspector

a. PCI Quality Control Technician/Inspector Level I Certificate with one year of related experience, or

b. Engineer-In-Training with one year of related experience

1.5.7 Post-tensioned Concrete Construction

1.5.7.1 Special Inspector

a. PTI Level 2 Unbonded PT Inspector Certificate, or

b. Registered Professional Engineer with 3 years of related experience

1.5.7.2 Associate Special Inspector

a. PTI Level 1 Unbonded PT Inspector Certificate with one year of related experience, or

b. Engineer-In-Training with one year of related experience

1.5.8 Masonry Construction

1.5.8.1 Special Inspector

a. ICC Structural Masonry Special Inspector Certificate with one year of related experience, or

b. Registered Professional Engineer with 3 years of related experience

1.5.8.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

1.5.9 Wood

1.5.9.1 Special Inspector

a. ICC Commercial Building Inspector Certificate with one year of related experience, or

b. ICC Residential Building Inspector with one year of experience, or

c. Registered Professional Engineer with 3 years of related experience

1.5.9.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

1.5.10 Verification of Site Soil Condition, Fill Placement and Load-Bearing Requirements

1.5.10.1 Special Inspector

a. ICC Soils Special Inspector Certificate with one year of related experience, or

b. National Institute for Certification in Engineering Technologies

(NICET) Soils Technician Level II Certificate in Construction Material Testing, or

c. Geologist-In-Training with 3 years of related experience, or

d. Registered Professional Engineer with 3 years of related experience

1.5.10.2 Associate Special Inspector

a. NICET Soils Technician Level I Certificate in Construction Material Testing with one year of related experience, or

b. Engineer-In-Training with one year of related experience

1.5.11 Deep Foundations

1.5.11.1 Special Inspector

a. NICET Soils Technician Level II Certificate in Construction Material Testing, or

b. Geologist-In-Training with 3 years of related experience, or

c. Registered Professional Engineer with 3 years of related experience

1.5.11.2 Associate Special Inspector

a. NICET Soils Technician Level I Certificate in Construction Material Testing with one year of related experience, or

b. NICET Geotechnical Engineering Technician Level I Construction or Generalist Certificate with one year of related experience, or

c. Engineer-In-Training with one year of related experience

1.5.12 Sprayed Fire-Resistive Material

1.5.12.1 Special Inspector

a. ICC Spray-applied Fireproofing Special Inspector Certificate, or

b. ICC Fire Inspector I Certificate with one year of related experience, or

c. Registered Professional Engineer or Architect with related experience

1.5.12.2 Associate Special Inspector

Engineer-In-Training with one year of related experience

1.5.13 Intumescent Fire-Resistive Coatings

1.5.13.1 Special Inspector

a. ICC Spray-applied Fireproofing Special Inspector Certificate, or

b. ICC Fire Inspector I Certificate with one year of related experience, or

c. Registered Professional Engineer or Architect with related experience

1.5.13.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

1.5.14 Exterior Insulation and Finish System (EIFS)

1.5.14.1 Special Inspector

a. Association of the Wall and Ceiling Industry (AWCI) EIFS Inspector Certificate, or

b. Exterior Design Institute Certificate, or

c. Registered Professional Engineer or Architect with related experience

1.5.14.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

1.5.15 Fire-Resistant Penetrations and Joints

1.5.15.1 Special Inspector

a. Passed the UL Firestop Exam with one year of related experience, or

b. Passed the FM Firestop Exam with one year of related experience, or

c. Passed the International Firestop Council Exam with one year of related experience, or

d. Registered Professional Engineer with related experience

1.5.15.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

1.5.16 Smoke Control

1.5.16.1 Special Inspector

a. Associated Air Balance Council (AABC) Technician Certification with one year of related experience, or

b. Registered Professional Engineer with related experience

1.5.16.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

1.5.17 Special Inspector of Record (SIOR)

Registered Professional Engineer with 5 years of related experience.

PART 2 PRODUCTS

2.1 SPECIAL INSPECTION OF FABRICATED ITEMS

Special Inspection of fabricator's work performed in the fabricator's shop is required to be inspected in accordance with the Statement of Special Inspections and the Schedule of Special Inspections unless the fabricator is certified by the approved agency to perform such work without Special Inspections. Submit the following applicable certifications to the Contracting Officer for information to allow work performed in the fabricator's shop to not be subjected to Special Inspections.

AISC Certified Steel Fabricator.

Truss Plate Institute (TPI) steel truss plant quality assurance program certification.

Truss Plate Institute (TPI) wood truss plant quality assurance program certification.

International Accreditation Service, AC472 Accreditation

Precast Concrete Institute (PCI) Certified Plant, Group C - Commercial (Structural) Products

At the completion of fabrication, submit a certificate of compliance, to be included with the comprehensive final report of Special Inspections, stating that the materials supplied and work performed by the fabricator are in accordance with the construction documents.

PART 3 EXECUTION

3.1 RESPONSIBILITIES

3.1.1 Special Inspector of Record

a. Supervise all Special Inspectors required by the Contract Documents and the IBC.

b. Submit an SIOR Letter of Acceptance to the Contracting Officer attesting to acceptance of the duties of SIOR, signed and sealed by the SIOR.

c. Verify the qualifications of all of the Special Inspectors.

d. Verify the qualifications of fabricators.

e. Submit Special Inspection agency's written NDT practices for the monitoring and control of the agency's operations to include the following:

(1) The agency's procedures for the selection and administration of inspection personnel, describing the training, experience and examination requirements for qualification and certification of inspection personnel.

(2) The agency's inspection procedures, including general inspection, material controls, and visual welding inspection.

f. Submit Qualification Records for Nondestructive Testing Technicians for nondestructive testing (NDT) technicians designated for the project.

g. Submit NDT procedures and equipment calibration records for NDT to be performed and equipment to be used for the project.

h. Prepare a Special Inspections Project Manual, which must cover the following:

(1) Roles and responsibilities of the following individuals during Special Inspections: SIOR, SI, ASI, General Contractor's QC Manager and SER.

(2) Organizational chart or communication plan, indicating lines of communication.

(3) Contractor's internal plan for scheduling inspections. Address items such as timeliness of inspection requests, whom to contact for inspection requests, and availability of alternate inspectors.

(4) Indicate the Government reporting requirements.

(5) Propose forms or templates to be used by SI and SIOR to document inspections.

(6) Indicate procedures for tracking nonconforming work and verification that corrective work is complete.

(7) Indicate how the SIOR and SI will participate in weekly QC meetings.

(8) Indicate how Special Inspections of shop fabricated items will be handled when the fabricator's shop is not certified in accordance with paragraph SPECIAL INSPECTION OF FABRICATED ITEMS.

(9) Include a section in the manual that covers each specific item requiring Special Inspections that is indicated on the Schedule of Special Inspections. Provide names and qualifications of each special inspector who will be performing the Special Inspections for each specific item. Provide details on how the Special Inspections are to be carried out for each item so that the expectations are clear for the General Contractor and the Subcontractor performing the work.

Make a copy of the Special Inspections Project Manual available on the job site during construction. Submit a copy of the Special Inspections Project Manual for approval.

i. Attend coordination and mutual understanding meeting where the information in the Special Inspections Project Manual will be reviewed to verify that all parties have a clear understanding of the Special Inspection provisions and the individual duties and responsibilities of each party.

j. Maintain a 3-ring binder for the Special Inspector's daily and special inspection biweekly reports and the Special Inspections Project Manual. This binder must be located in a conspicuous place in the project trailer/office to allow review by the Contracting Officer and

the SER.

k. Submit a copy of the Special Inspector's special inspection daily reports to the QC Manager.

l. Discrepancies that are observed during Special Inspections must be reported to the QC Manager for correction. If discrepancies are not corrected before the Special Inspector leaves the site, the observed discrepancies must be documented in the daily report.

m. Submit a biweekly Special Inspections report until all work requiring Special Inspections is complete. A report is required for each biweekly period in which Special Inspection activity occurs; the report must include the following:

(1) A brief summary of the work performed during the reporting time frame.

(2) Changes from and discrepancies with the drawings, specifications and mechanical or electrical component certification that were observed during the reporting period.

(3) Discrepancies which were resolved or corrected.

(4) A list of nonconforming items requiring resolution.

(5) All applicable test results including nondestructive testing reports.

n. At the completion of each Definable Feature of Work (DFOW) requiring Special Inspections, submit an interim report that documents the Special Inspections completed for that DFOW, including corrections of all discrepancies noted in the daily reports. Interim reports of Special Inspections must be signed and dated by the SIOR.

o. At the completion of the project submit a comprehensive final report of Special Inspections that documents the Special Inspections completed for the project including corrections of all discrepancies noted in the daily reports. The comprehensive final report of Special Inspections must be signed, dated and sealed by the SIOR.

3.1.2 Quality Control Manager

a. Maintain a rework items list that includes discrepancies noted on the Special Inspector's daily report.

3.1.3 Special Inspectors

a. Inspect all elements of the project which the special inspector is qualified to inspect and which are identified in the Schedule of Special Inspections.

b. Attend preparatory phase meetings related to the Definable Feature of Work (DFOW) which the Special Inspector is qualified to inspect.

c. Submit Special Inspection agency's written NDT practices for the monitoring and control of the agency's operations, to include the following:

(1) The agency's procedures for the selection and administration of inspection personnel, describing the training, experience and examination requirements for qualification and certification of inspection personnel.

(2) The agency's inspection procedures, including general inspection, material controls, and visual welding inspection.

d. Submit Qualification Records for Nondestructive Testing Technicians for nondestructive testing (NDT) technicians designated for the project.

e. Submit NDT procedures and equipment calibration records for NDT to be performed and equipment to be used for the project.

f. Submit a copy of the special inspection daily reports to the QC Manager.

g. Report discrepancies that are observed during Special Inspections to the QC Manager for correction. If discrepancies are not corrected before the special inspector leaves the site the observed discrepancies must be documented in the daily report.

h. Submit a biweekly Special Inspection Report until all inspections are complete. A report is required for each biweekly period in which Special Inspections activity occurs, and must include the following:

(1) A brief summary of the work performed during the reporting time frame.

(2) Changes from and discrepancies with the drawings, specifications and mechanical or electrical component certification that were observed during the reporting period.

(3) Discrepancies which were resolved or corrected.

(4) A list of nonconforming items requiring resolution.

(5) All applicable test result, including nondestructive testing reports.

i. At the completion of each DFOW requiring Special Inspections, submit an interim report of Special Inspections that documents the Special Inspections completed for that DFOW. Identify the inspector responsible for each item inspected and corrections of all discrepancies noted in the daily reports. The interim report of Special Inspections must be signed and dated and it must indicate the certification of the Special Inspector qualifying them to conduct the inspection.

j. At the completion of the project, submit a comprehensive final report of Special Inspections that documents the Special Inspections completed for the project and corrections of all discrepancies noted in the daily reports. The comprehensive final report of Special Inspections must be signed and dated and it must indicate the certification of the Special Inspector qualifying them to conduct the inspection.

k. Submit special inspection daily reports to the SIOR.

3.1.4 Structural Engineer of Record (SER)

a. Develop the Statement of Special Inspections and the Schedule of Special Inspections as defined in Chapter 17 of ICC IBC using the templates located on the Whole Building Design Guide website at: www.wbdg.org/dod/ufgs/ufgs-01-45-35. Submit the Statement of Special Inspections and the Schedule of Special Inspections for approval by the Contracting Officer.

   The Statement of Special Inspections must include the following information:

   (1) List of Architectural Components that are part of the Designated Seismic System.

   (2) List of Mechanical Components that are part of the Designated Seismic System.

   (3) List of the Electrical Components that are part of the Designated Seismic System.

   (4) List of periodic walk-down inspections required by UFC 3-301-01.

b. Under the Structural Concrete Construction section of the Schedule of Special Inspection, include the Task "Inspect concrete repair substrate preparation and repair material application for proper application techniques" with a "Periodic" Inspection Type.

c. Prior to the start of structural observations submit a written statement identifying the frequency and extent of structural observations.

d. At the conclusion of the structural observations submit a final report of structural observations indicating that the structural observation site visits have been made and identify any reported deficiencies which, to the best of the structural observer's knowledge, have not been resolved.

e. Perform a final walk-down inspection of the mechanical and electrical components that are part of the designated seismic system with the Nonstructural Component Design Review Panel to ensure that the nonstructural components satisfy life safety mounting requirements as defined in the Statement of Special Inspections.

f. Submit a report of the final walk-down inspection that includes the following:

   (1) Record of/observations from final site visit.

   (2) Documentation that all required inspections were performed in accordance with the Statement of Special Inspections.

   (3) Documentation that the Designated Seismic Systems were installed in accordance with the construction documents and the requirements of ICC IBC Chapter 17, as modified by UFC 3-301-01 or UFC 3-301-02.

3.2 DEFECTIVE WORK

Check work as it progresses, but failure to detect any defective work or materials must in no way prevent later rejection if defective work or materials are discovered, nor obligate the Contracting Officer to accept the defective work or materials.

-- End of Section --

SECTION 01 50 00

TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS
11/20, CHG 3: 08/24

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	(2017; R 2021) Reduced-Pressure Principle Backflow Prevention Assembly

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2023; ERTA 1 2024; TIA 24-1; TIA 25-2) National Electrical Code
NFPA 241	(2022; ERTA 22-1) Standard for Safeguarding Construction, Alteration, and Demolition Operations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

MUTCD	(2023) Manual on Uniform Traffic Control Devices

1.2 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Construction Site Plan; G

Traffic Control Plan; G

Haul Road Plan; G

Contractor Computer Cybersecurity Compliance Statements; G

Contractor Temporary Network Cybersecurity Compliance Statements; G

SD-06 Test Reports

Backflow Preventer Tests

SD-07 Certificates

Backflow Tester Certification

Backflow Preventers Certificate of Full Approval

1.3 CONSTRUCTION SITE PLAN

Prior to the start of work, submit for Government approval a site plan showing the locations and dimensions of temporary facilities (including layouts and details, equipment and material storage area (onsite and offsite), and access and haul routes, avenues of ingress/egress to the fenced area and details of the fence installation. Identify any areas which may have to be graveled to prevent the tracking of mud. Indicate if the use of a supplemental or other staging area is desired. Show locations of safety and construction fences, site trailers, construction entrances, trash dumpsters, temporary sanitary facilities, and worker parking areas.

1.4 BACKFLOW PREVENTERS CERTIFICATE

1.4.1 Backflow Tester Certificate

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 must not be affiliated with a company participating in other phases of this Contract.

1.4.2 Backflow Prevention Training Certificate

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 CONDITION OF READINESS (COR) LEVELS FOR WEATHER

The Condition of Readiness (COR) is based on the weather forecast and the potential for sustained winds 50 knots (58 mph) or greater. Contact the Contracting Officer for the current COR.

Monitor weather conditions a minimum of twice a day and take appropriate actions according to the approved Emergency Plan in the accepted Accident Prevention Plan, EM 385-1-1 Emergency Plan requirements and the instructions below.

Unless otherwise directed by the Contracting Officer, 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 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 3.3 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 weather and 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 ONE" which cannot be completed within 18 hours. 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. Review requirements pertaining to "Condition TWO" and continue action as necessary to attain "Condition THREE" readiness.

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.

1.6 CYBERSECURITY DURING CONSTRUCTION

{For Reference Only: This subpart (and its subparts) relates to AC-18, SA-3, CCI-00258.} Meet the following requirements throughout the construction process.

1.6.1 Contractor Computer Equipment

Contractor owned computers may be used for construction. When used, contractor computers must meet the following requirements:

1.6.1.1 Operating System

The operating system must be an operating system currently supported by the manufacturer of the operating system. The operating system must be current on security patches and operating system manufacturer required updates.

1.6.1.2 Anti-Malware Software

The computer must run anti-malware software from a reputable software manufacturer. Anti-malware software must be a version currently supported by the software manufacturer, must be current on all patches and updates, and must use the latest definitions file. All computers used on this project must be scanned using the installed software at least once per day.

1.6.1.3 Passwords and Passphrases

The passwords and passphrases for all computers must be changed from their default values. Passwords must be a minimum of eight characters with a minimum of one uppercase letter, one lowercase letter, one number and one special character.

1.6.1.4 Contractor Computer Cybersecurity Compliance Statements

Provide a single submittal containing completed Contractor Computer Cybersecurity Compliance Statements for each company using contractor owned computers. Contractor Computer Cybersecurity Compliance Statements must use the template published at https://www.wbdg.org/dod/ufgs/ufgs-01-50-00. Each Statement must be signed by a cybersecurity representative for the relevant company.

1.6.2 Temporary IP Networks

Temporary Contractor-installed IP networks may be used during construction. When used, temporary contractor-installed IP networks must meet the following requirements:

1.6.2.1 Network Boundaries and Connections

The network must not extend outside the project site and must not connect to any IP network other than IP networks provided under this project or Government furnished IP networks provided for this purpose. Any and all network access from outside the project site is prohibited.

1.6.3 Government Access to Network

Government personnel, as defined, prescribed, and identified by the Contracting Officer, must be allowed to have complete and immediate access to the network at any time in order to verify compliance with this specification. If there is a Government agency responsible for network access, identify that agency.

1.6.4 Temporary Wireless IP Networks

1.6.4.1 Contractor Provided Wi-Fi Network

Provide standalone Wi-Fi network for authorized Government personnel. Network access must be available throughout the jobsite and for the entire Contract period. The Government will use the Wi-Fi service for coordination in the field and related activities. Do not attach or connect the temporary Wi-Fi network to Government networks or systems unrelated to construction activities.

Password information must adhere to requirements outlined in Paragraph PASSWORDS AND PASSPHRASES. Provide password and Wi-Fi network name (SSID) to the Contracting Officer for Government personnel access. Wi-Fi performance must be capable of handling bandwidth to support Government and Contractor activities, including drawing and model access onsite. Provide a point of contact for reporting Wi-Fi outages.

1.6.4.2 Temporary Wireless IP Networks Security

In addition to the other requirements on temporary IP networks, temporary wireless IP (WiFi) networks must not interfere with existing wireless network and must use WPA2 security. Network names (SSID) for wireless networks must be changed from their default values.

1.6.5 Passwords and Passphrases

The passwords and passphrases for all network devices and network access must be changed from their default values. Passwords must be a minimum 8

characters with a minimum of one uppercase letter, one lowercase letter, one number and one special character.

1.6.6 Contractor Temporary Network Cybersecurity Compliance Statements

Provide a single submittal containing completed Contractor Temporary Network Cybersecurity Compliance Statements for each company implementing a temporary IP network. Contractor Temporary Network Cybersecurity Compliance Statements must use the template published at https://www.wbdg.org/dod/ufgs/ufgs-01-50-00. Each Statement must be signed by a cybersecurity representative for the relevant company. If no temporary IP networks will be used, provide a single copy of the Statement indicating this.

PART 2 PRODUCTS

2.1 TEMPORARY SIGNAGE

2.1.1 Bulletin Board

Prior to the commencement of work activities, provide a clear weatherproof covered bulletin board not less than 36 by 48 inches in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the Contract, Wage Rate Information poster, Safety and Health Information as required by EM 385-1-1 and other information approved by the Contracting Officer. Coordinate requirements herein with 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS. Locate the bulletin board at the project site in a conspicuous place easily accessible to all employees, and in location as approved by the Contracting Officer.

2.1.2 Project Identification Signs

The requirements for the signs, their content, and location are as indicated. Erect signs within 15 days after receipt of the notice to proceed. Correct the data required by the safety sign daily, with light colored metallic or non-metallic numerals. Project signage must be visible and legible from Terrier Ave and all construction entrances.

2.1.3 Warning Signs

Post temporary signs, tags, and labels to give workers and the public adequate warning and caution of construction hazards according to the EM 385-1-1. Attach signs to the perimeter fencing every 150 feet warning the public of the presence of construction hazards. Signs must require unauthorized persons to keep out of the construction site. Correct the data required by safety signs daily. Post signs at all points of entry designating the construction site as a hard hat area.

2.2 TEMPORARY TRAFFIC CONTROL

2.2.1 Haul Roads

Construct access and haul roads necessary for proper prosecution of the work under this Contract in accordance with EM 385-1-1. Construct with suitable grades and widths; avoid sharp curves, blind corners, and dangerous cross traffic. Submit haul road plan for approval. Provide necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. The method of dust control, although optional, must be adequate to ensure safe operation at all times. Location, grade,

width, and alignment of construction and haul roads are subject to approval by the Contracting Officer. Lighting must be adequate to assure full and clear visibility for full width of haul road and work areas during any night work operations.

2.2.2 Barricades

Erect and maintain temporary barricades to limit public access to hazardous areas. Barricades are required whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Securely place barricades clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

2.3 FENCING

Provide fencing along the construction site and at all open excavations and tunnels to control access by unauthorized personnel. Safety fencing must be highly visible to be seen by pedestrians and vehicular traffic. All fencing must meet the requirements of EM 385-1-1. Remove the fence upon completion and acceptance of the work.

2.3.1 Polyethylene Mesh Safety Fencing

Temporary safety fencing must be a high visibility orange colored, high density polyethylene grid, a minimum of 48 inches high and maximum mesh size of 2 inches. Fencing must extend from the grade to a minimum of 48 inches above the grade and be tightly secured to T-posts spaced as necessary to maintain a rigid and taut fence. Fencing must remain rigid and taut with a minimum of 200 pounds of force exerted on it from any direction with less than 4 inches of deflection.

2.3.2 Chain Link Panel Fencing

Temporary panel fencing must be galvanized steel chain link panels 6 feet high. Multiple fencing panels may be linked together at the bases to form long spans as needed. Each panel base must be weighted down using sand bags or other suitable materials in order for the fencing to withstand anticipated winds while remaining upright. Fencing must remain rigid and taut with a minimum of 200 pounds of force exerted on it from any direction with less than 4 inches of deflection.

2.3.3 Post-Driven Chain Link Fencing

Temporary post-driven fencing must be galvanized chain link fencing 8 feet high supported by an tightly secured to galvanized steel posts driven below grade. Fence posts must be located on minimum 10 foot centers. Posts may be set in various surfaces such as sand, soil, asphalt or concrete as necessary. Chain link fencing must remain rigid and taut with a minimum of 200 pounds of force exerted on it from any direction with less than 4 inches of deflection. Completely remove fencing and posts at the completion of construction and restore surfaces disturbed or damaged to its original condition. Locate and identify underground utilities prior to setting fence posts. Equip fence with a lockable gate. Gate must remain locked when construction personnel are not present.

2.4 TEMPORARY WIRING

Provide temporary wiring in accordance with EM 385-1-1, NFPA 241 and NFPA 70. Include monthly inspection and testing of all equipment and apparatus.

2.5 BACKFLOW PREVENTERS

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 is not acceptable.

Reduced pressure principle type conforming to the applicable requirements AWWA C511. Provide backflow preventers complete with 150 pound flanged mounted gate valve and strainer, 304 stainless steel or bronze, internal parts.

PART 3 EXECUTION

3.1 EMPLOYEE PARKING

Construction Contract employees must park privately owned vehicles in an area designated by the Contracting Officer. Employee parking must not interfere with existing and established parking requirements of the Government installation.

3.2 AVAILABILITY AND USE OF UTILITY SERVICES

3.2.1 Temporary Utilities

Provide temporary utilities required for construction. Materials may be new or used, must be adequate for the required usage, not create unsafe conditions, and not violate applicable codes and standards.

3.2.2 Payment for Utility Services

a. The Government will make all reasonably required utilities available from existing outlets and supplies, as specified in the Contract. Unless otherwise provided in the Contract, the amount of each utility service consumed will be charged to or paid at prevailing rates charged to the Government or, where the utility is produced by the Government, at reasonable rates determined by the Contracting Officer. Carefully conserve utilities furnished without charge.

b. The point at which the Government will deliver such utilities or services and the quantity available must be coordinated with the Contracting Officer. Pay all costs incurred in connecting, converting, and transferring the utilities to the work. Make connections, including providing backflow-preventing devices on connections to domestic water lines; providing meters; and providing transformers; and make disconnections. Under no circumstances will taps to base fire hydrants be allowed for obtaining domestic water.

3.2.3 Meters and Temporary Connections

Provide and maintain necessary temporary connections, distribution lines, and meter bases (Government will provide meters) required to measure the amount of each utility used for the purpose of determining charges. Notify the Contracting Officer, in writing, 5 working days before final electrical connection is desired so that a utilities contract can be established. The Government will provide a meter and make the final hot connection after inspection and approval of the Contractor's temporary wiring installation. Do not make the final electrical connection.

3.2.4 Advance Deposit

An advance deposit for utilities consisting of an estimated month's usage or a minimum of $50.00 will be required. The last monthly bills for the fiscal year will normally be offset by the deposit and adjustments will be billed or returned as appropriate. Services to be rendered for the next fiscal year, beginning 1 October, will require a new deposit. Notification of the due date for this deposit will be mailed prior to the end of the current fiscal year.

3.2.5 Final Meter Reading

Before completion of the work and final acceptance of the work by the Government, notify the Contracting Officer, in writing, 5 working days before termination is desired. The Government will take a final meter reading, disconnect service, and remove the meters. Then remove all the temporary distribution lines, meter bases, and associated appurtenances. Pay all outstanding utility bills before final acceptance of the work by the Government.

3.2.6 Sanitation

Provide and maintain within the construction area minimum field-type sanitary facilities in accordance with EM 385-1-1. Locate the facilities behind the construction fence or out of the public view. Clean units and empty wastes at least once a week or more frequently into a municipal, district, or station sanitary sewage system, or remove waste to a commercial facility. Obtain approval from the system owner prior to discharge into a municipal, district, or commercial sanitary sewer system. Penalties or fines associated with improper discharge will be the responsibility of the Contractor. Coordinate with the Contracting Officer and follow station regulations and procedures when discharging into the station sanitary sewer system. Maintain these conveniences at all times. Include provisions for pest control and elimination of odors. Government toilet facilities will not be available to Contractor's personnel.

3.2.7 Telephone

Make arrangements and pay all costs for telephone facilities desired.

3.2.8 Fire Protection

Provide temporary fire protection equipment for the protection of personnel and property during construction. Remove debris and flammable materials daily to minimize potential hazards.

3.3 TRAFFIC PROVISIONS

3.3.1 Maintenance of Traffic

a. Conduct operations in a manner that will not close a thoroughfare or interfere with traffic on railways or highways except with written permission of the Contracting Officer at least 15 calendar days prior to the proposed modification date, and provide a Traffic Control Plan for Government approval detailing the proposed controls to traffic movement for approval. The plan must be in accordance with State and local regulations and the MUTCD, Part VI. Make all notifications and obtain all permits required for modification to traffic movements outside Station's jurisdiction. Contractor may move oversized and slow-moving vehicles to the worksite provided requirements of the highway authority have been met.

b. Conduct work so as to minimize obstruction of traffic, and maintain traffic on at least half of the roadway width at all times. Obtain approval from the Contracting Officer prior to starting any activity that will obstruct traffic.

c. Provide, erect, and maintain, at Contractor's expense, lights, barriers, signals, passageways, detours, Life Safety Signage, overhead protection, and other items that may be required by the authority having jurisdiction.

d. 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.

3.3.2 Protection of Traffic

Maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Contracting Officer. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment the work, and the erection and maintenance of adequate warning, danger, and direction signs, will be as required by the State and local authorities having jurisdiction. Provide self-illuminated (lighted) barricades during hours of darkness. All personnel working in roadways will wear brightly-colored vests or other high visibility apparel in accordance with EM 385-1-1. Protect the traveling public from damage to person and property. Minimize the interference with public traffic on roads selected for hauling material to and from the site. Investigate the adequacy of existing roads and their allowable load limit. Contractor is responsible for the repair of damage to roads caused by construction operations.

3.3.3 Rush Hour Restrictions

Do not interfere with the peak traffic flows preceding and during normal operations without notification to and approval by the Contracting Officer.

3.3.4 Dust Control

Dust control methods and procedures must be approved by the Contracting Officer. Coordinate dust control methods with 01 57 19 TEMPORARY

ENVIRONMENTAL CONTROLS.

3.4 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.

Perform backflow preventer tests 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 must 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.

3.5 CONTRACTOR'S TEMPORARY FACILITIES

Contractor is responsible for security of their property. Provide adequate outside security lighting at the temporary facilities. Trailers must be anchored to resist high winds and meet applicable state or local standards for anchoring mobile trailers. Coordinate anchoring with EM 385-1-1. The Contract Clause entitled "FAR 52.236-10, Operations and Storage Areas" and the following apply:

3.5.1 Administrative Field Offices

Provide and maintain administrative field office facilities within the construction area at the designated site. Government office and warehouse facilities will not be available to the Contractor's personnel.

In the event a new building is constructed for the temporary project field office, it must be a minimum 12 feet in width, 16 feet in length and have a minimum of 7 feet headroom. Equip the building with approved electrical wiring, at least one double convenience outlet and the required switches and fuses to provide 110-120 volt power. Provide a work table with stool, desk with chair, two additional chairs, and one legal size file cabinet that can be locked. The building must be waterproof, supplied with a heater, have a minimum of two doors, electric lights, a telephone, a battery-operated smoke detector alarm, a sufficient number of adjustable windows for adequate light and ventilation, and a supply of approved drinking water. Provide approved sanitary facilities. Screen the windows and doors and provide the doors with deadbolt type locking devices or a padlock and heavy-duty hasp bolted to the door. Door hinge pins must be non-removable. Arrange the windows to open and to be securely fastened from the inside. Protect glass panels in windows by bars or heavy mesh screens to prevent easy access. In warm weather, provide air conditioning capable of maintaining the office at 50 percent relative humidity and a room temperature 20 degrees F below the outside temperature when the outside temperature is 95 degrees F. Unless otherwise directed by the Contracting Officer, remove the building from the site upon completion and acceptance of the work.

3.5.2 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.

3.5.3 Storage Area

Construct a temporary 6 foot high chain link fence around trailers and materials. Include plastic strip inserts, colored green, so that visibility through the fence is obstructed. Fence posts may be driven, in lieu of concrete bases, where soil conditions permit. Do not place or store trailers, materials, or equipment outside the fenced area unless such trailers, materials, or equipment are assigned a separate and distinct storage area by the Contracting Officer away from the vicinity of the construction site but within the installation boundaries. Trailers, equipment, or materials must not be open to public view with the exception of those items which are in support of ongoing work on the current day. Do not stockpile materials outside the fence in preparation for the next day's work. Park mobile equipment, such as tractors, wheeled lifting equipment, cranes, trucks, and like equipment within the fenced area at the end of each work day.

Keep fencing in a state of good repair and proper alignment. If the Contractor elects to traverse grassed or unpaved areas which are not established roadways with construction equipment or other vehicles, cover the grassed or unpaved areas with a layer of gravel as necessary to prevent rutting and the tracking of mud onto paved or established roadways; gravel gradation must be at the Contractor's discretion. Mow and maintain grass located within the boundaries of the construction site for the duration of the project. Grass and vegetation along fences, structures, under trailers, and in areas not accessible to mowers must be edged or trimmed neatly.

3.5.4 Supplemental Storage Area

Upon request, and pending availability, the Contracting Officer will designate another or supplemental area for the use and storage of trailers, equipment, and materials. This area may not be in close proximity of the construction site but will be within the installation boundaries. Maintain the area in a clean and orderly fashion and secured if needed to protect supplies and equipment. Utilities will not be provided to this area by the Government.

3.5.5 Appearance of Trailers

a. Trailers must be roadworthy and comply with all appropriate state and local vehicle requirements. Trailers which are rusted, have peeling paint or are otherwise in need of repair will not be allowed on Installation property. Trailers must present a clean and neat exterior appearance and be in a state of good repair.

b. Maintain the temporary facilities. Failure to do so will be sufficient reason to require their removal at the Contractor's expense.

3.5.6 Trailers or Storage Buildings

a. Trailers or storage buildings will be permitted, where space is available, subject to the approval of the Contracting Officer.

b. Mount a sign not smaller than 13.78 by 13.78 inches on the trailer or building that shows the company name, business phone number, emergency phone number and conforms to the following requirements and sketch:

Graphic panel	Aluminum, painted blue
Copy	Screen painted or vinyl die-cut, white
Typeface	Univers 65 u/lc
See Sketch No. 01500 (graphic).	

3.5.7 Safety Systems

Protect the integrity of all installed safety systems or personnel safety devices. Obtain prior approval from the Contracting Officer if entrance into systems serving safety devices is required. If it is temporarily necessary to remove or disable personnel safety devices in order to accomplish Contract requirements, provide alternative means of protection prior to removing or disabling any permanently installed safety devices or equipment and obtain approval from the Contracting Officer.

3.5.8 Special Storage Requirements

The following special storage requirements apply:

3.5.8.1 Storage in Existing Buildings

The Contractor will be working in existing building; the storage of material will not be allowed in the building.

3.5.9 Weather Protection of Temporary Facilities and Stored Materials

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. Ensure that the openings are completely sealed off to protect materials and equipment in the building from damage.

3.5.9.1 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 must 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.

3.6 PLANT COMMUNICATIONS

Whenever the individual elements of the plant are located so that operation by normal voice between these elements is not satisfactory, install a satisfactory means of communication, such as telephone or other suitable devices and make available for use by Government personnel.

3.7 TEMPORARY PROJECT SAFETY FENCING

As soon as practicable, but not later than 15 days after the date established for commencement of work, furnish and erect temporary project safety fencing at the work site. Maintain the safety fencing during the life of the Contract and, upon completion and acceptance of the work, remove from the work site.

3.8 DUMPSTERS

Equip dumpsters with a secure cover and paint the standard installation color. Keep dumpster closed, except when being loaded with trash and debris. Locate dumpsters behind the construction fence or out of the public view. Empty site dumpsters at least once a week, or as needed to keep the site free of debris and trash. If necessary, provide 55 gallon trash containers painted the darker installation color to collect debris in the construction site area. For large demolitions, large dumpsters without lids are acceptable, but must not have debris higher than the sides before emptying.

3.9 CLEANUP

Remove construction debris, waste materials, packaging material and the like from the work site daily. Any dirt or mud which is tracked onto paved or surfaced roadways must be cleaned away. Store all salvageable materials resulting from demolition activities within the fenced area described above or at the supplemental storage area. Neatly stack stored materials not in trailers, whether new or salvaged.

3.10 RESTORATION OF STORAGE AREA

Upon completion of the project remove the bulletin board, signs, barricades, haul roads, and all other temporary products from the site. After removal of trailers, materials, and equipment from within the fenced area, remove the fence. Restore areas used during the performance of the Contract to the original or better condition. Remove gravel used to traverse grassed areas and restore the area to its original condition, including top soil and seeding as necessary.

-- End of Section --

SECTION 01 57 19

TEMPORARY ENVIRONMENTAL CONTROLS
08/22, CHG 2: 08/25

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 E2356	(2018) Standard Practice for Comprehensive Building Asbestos Surveys

STATE OF VIRGINIA ADMINISTRATIVE CODE (VAC)

9 VAC 25-840	Title 9, Agency 25, Chapter 840: Erosion And Sediment Control Regulations
9 VAC 25-850	Title 9, Agency 25, Chapter 850: Erosion And Sediment Control And Stormwater Management Certification Regulations
9 VAC 25-870	Title 9, Agency 25, Chapter 870: Virginia Stormwater Management Program (VSMP) Regulation

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA SW-846	(Third Edition; Update VII) Test Methods for Evaluating Solid Waste: Physical/Chemical Methods

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

29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
29 CFR 1910.1053	Respirable Crystalline Silica
29 CFR 1910.1200	Hazard Communication
29 CFR 1926.1153	Respirable Crystalline Silica
40 CFR 50	National Primary and Secondary Ambient Air Quality Standards
40 CFR 60	Standards of Performance for New Stationary Sources
40 CFR 61.145	Standard for Demolition and Renovation
40 CFR 63	National Emission Standards for Hazardous Air Pollutants for Source Categories

40 CFR 64	Compliance Assurance Monitoring
40 CFR 82	Protection of Stratospheric Ozone
40 CFR 112	Oil Pollution Prevention
40 CFR 122.26	Storm Water Discharges (Applicable to State NPDES Programs, see section 123.25)
40 CFR 152	Pesticide Registration and Classification Procedures
40 CFR 152 - 186	Pesticide Programs
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 261.7	Residues of Hazardous Waste in Empty Containers
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 262.11	Hazardous Waste Determination and Recordkeeping
40 CFR 262.34	Standards Applicable to Generators of Hazardous Waste-Accumulation Time
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 273	Standards for Universal Waste Management

40 CFR 273.2	Standards for Universal Waste Management - Batteries
40 CFR 273.4	Standards for Universal Waste Management - Mercury Containing Equipment
40 CFR 273.5	Standards for Universal Waste Management - Lamps
40 CFR 273.6	Applicability - Aerosol Cans
40 CFR 279	Standards for the Management of Used Oil
40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan
40 CFR 300.125	National Oil and Hazardous Substances Pollution Contingency Plan - Notification and Communications
40 CFR 355	Emergency Planning and Notification
40 CFR 372	Toxic Chemical Release Reporting
40 CFR 403	General Pretreatment Regulations for Existing and New Sources of Pollution
40 CFR 745	Lead-Based Paint Poisoning Prevention in Certain Residential Structures
40 CFR 761	Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
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 172.101	Hazardous Material Regulation-Purpose and Use of Hazardous Material Table
49 CFR 173	Shippers - General Requirements for Shipments and Packagings
49 CFR 178	Specifications for Packagings

1.2 DEFINITIONS

1.2.1 Class I and II Ozone Depleting Substance (ODS)

Class I ODS is defined in Section 602(a) of The Clean Air Act. A list of Class I ODS can be found on the EPA website at the following weblink. https://www.epa.gov/ozone-layer-protection/ozone-depleting-substances.

Class II ODS is defined in Section 602(s) of The Clean Air Act. A list of

Class II ODS can be found on the EPA website at the following weblink. https://www.epa.gov/ozone-layer-protection/ozone-depleting-substances.

1.2.2 Contractor Generated Hazardous Waste

Contractor generated hazardous waste is materials that, if abandoned or disposed of, may meet the definition of a hazardous waste. These waste streams would typically consist of material brought on site by the Contractor to execute work, but are not fully consumed during the course of construction. Examples include, but are not limited to, excess paint thinners (i.e., methyl ethyl ketone, toluene), waste thinners, excess paints, excess solvents, waste solvents, excess pesticides, and contaminated pesticide equipment rinse water.

1.2.3 Electronics Waste

Electronics waste is discarded electronic devices intended for salvage, recycling, or disposal.

1.2.4 Environmental Pollution and Damage

Environmental pollution and damage is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally or historically.

1.2.5 Environmental Protection

Environmental protection is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2.6 Hazardous Debris

As defined in paragraph SOLID WASTE, debris that contains listed hazardous waste (either on the debris surface, or in its interstices, such as pore structure) in accordance with 40 CFR 261. Hazardous debris also includes debris that exhibits a characteristic of hazardous waste in accordance with 40 CFR 261.

1.2.7 Hazardous Materials

Hazardous material is any material that: Is defined in 49 CFR 171, listed in 49 CFR 172, regulated as a hazardous material in accordance with 49 CFR 173; or requires a Safety Data Sheet (SDS) in accordance with 29 CFR 1910.1200; or during end use, treatment, handling, packaging, storage, transportation, 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 sections or directives, does not eliminate the need for adherence to that hazard-specific guidance which takes precedence over this section for "control" purposes. Such material includes 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).

1.2.8 Hazardous Waste

Hazardous Waste is any material that meets the definition of a solid waste and exhibits a hazardous characteristic (ignitability, corrosivity, reactivity, or toxicity) as specified in 40 CFR 261, Subpart C, or contains a listed hazardous waste as identified in 40 CFR 261, Subpart D, or meets a state, local, or host nation definition of a hazardous waste.

1.2.9 Land Application

Land Application means spreading or spraying discharge water at a rate that allows the water to percolate into the soil. No sheeting action, soil erosion, discharge into storm sewers, discharge into defined drainage areas, or discharge into the "waters of the United States" must occur. Comply with federal, state, and local laws and regulations.

1.2.10 Municipal Separate Storm Sewer System (MS4) Permit

MS4 permits are those held by municipalities or installations to obtain NPDES permit coverage for their stormwater discharges.

1.2.11 National Pollutant Discharge Elimination System (NPDES)

The NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States.

1.2.12 Oily Waste

Oily waste are those materials that are, or were, mixed with Petroleum, Oils, and Lubricants (POLs) and have become separated from that POLs. 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, POLs 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: It is not prohibited in other state regulations or local ordinances; the amount generated is "de minimus" (a small amount); it is the result of minor leaks or spills resulting from normal process operations; and free-flowing oil has been removed to the practicable 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, perform a hazardous waste determination 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.

1.2.13 Pesticide

Pesticide is any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest, or intended for use as a plant regulator, defoliant or desiccant.

1.2.14 Pesticide Treatment Plan

A plan for the prevention, monitoring, and control to eliminate pest infestation.

1.2.15 Pests

Pests are arthropods, birds, rodents, nematodes, fungi, bacteria, viruses, algae, snails, marine borers, snakes, weeds and other organisms (except for human or animal disease-causing organisms) that adversely affect readiness, military operations, or the well-being of personnel and animals; attack or damage real property, supplies, equipment, or vegetation; or are otherwise undesirable.

1.2.16 Regulated Waste

Regulated waste are solid wastes that have specific additional federal, state, or local controls for handling, storage, or disposal.

1.2.17 Sediment

Sediment is soil and other debris that have eroded and have been transported by runoff water or wind.

1.2.18 Solid Waste

Solid waste is a solid, liquid, semi-solid or contained gaseous waste. A solid waste can be a hazardous waste, non-hazardous waste, or non-Resource Conservation and Recovery Act (RCRA) regulated waste. Types of solid waste typically generated at construction sites may include:

1.2.18.1 Debris

Debris is non-hazardous solid material generated during the construction, demolition, or renovation of a structure that exceeds 2.5-inch particle size that is: a manufactured object; plant or animal matter; or natural geologic material (for example, 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.

1.2.18.2 Green Waste

Green waste is 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.

1.2.18.3 Material Not Regulated As Solid Waste

Material not regulated as solid waste is 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.

1.2.18.4 Non-Hazardous Waste

Non-hazardous waste is waste that is excluded from, or does not meet, hazardous waste criteria in accordance with 40 CFR 261.

1.2.18.5 Recyclables

Recyclables are materials, equipment and assemblies such as doors, windows, door and window frames, plumbing fixtures, glazing and mirrors that are recovered and sold as recyclable, wiring, insulated/non-insulated copper wire cable, wire rope, and structural components. It also includes commercial-grade refrigeration equipment with Freon removed, household appliances where the basic material content is metal, clean polyethylene terephthalate bottles, cooking oil, used fuel oil, textiles, high-grade paper products and corrugated cardboard, stackable pallets in good condition, clean crating material, and clean rubber/vehicle tires. Metal meeting the definition of "lead contaminated" or "lead based paint contaminated" may be included as recyclable only if the metal is handled and transported in accordance with regulations, and the facility receiving the material is permitted and authorized to accept and process lead contaminated materials. Paint cans that meet the definition of empty containers in accordance with 40 CFR 261.7 may be included as recyclable if sold to a scrap metal company.

1.2.18.6 Surplus Soil

Surplus soil is 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 and must be managed in accordance with paragraph HAZARDOUS MATERIAL MANAGEMENT.

1.2.18.7 Scrap Metal

This includes 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.

1.2.18.8 Wood

Wood is dimension and non-dimension lumber, plywood, chipboard, hardboard. Treated or painted wood that meets the definition of lead contaminated or lead based contaminated paint is not included. Treated wood includes, but is not limited to, lumber, utility poles, crossties, and other wood products with chemical treatment.

1.2.19 Surface Discharge

Surface discharge means discharge of water into drainage ditches, storm sewers, or creeks meeting the definition of "waters of the United States". Surface discharges from construction sites are discrete, identifiable sources and require a permit from the governing agency. Comply with federal, state, and local laws and regulations.

1.2.20 Wastewater

Wastewater is the aqueous liquid waste generated by a project, to include both domestic wastewater (sewage) and industrial wastewater.

1.2.20.1 Stormwater

Stormwater is any precipitation in an urban or suburban area that does not evaporate or soak into the ground, but instead collects and flows into storm drains, rivers, and streams.

1.2.21 Waters of the United States

Waters of the United States means Federally jurisdictional waters, including wetlands, that are subject to regulation under Section 404 of the Clean Water Act or navigable waters, as defined under the Rivers and Harbors Act.

1.2.22 Wetlands

Wetlands are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

1.2.23 Universal Waste

The universal waste regulations streamline collection requirements for certain hazardous wastes in the following categories: batteries, pesticides, mercury-containing equipment (for example, thermostats), and lamps (for example, 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" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Contractor Hazardous Material Inventory Log; G

Soil Management Plan; G

Laboratory Certifications/Accreditations; G

Imported Fill Management Plan; G

Imported Fill Summary Report; G

Dewatering Work Plan; G

Waste Management and Sampling Plan; G

Storage Material Inventory

Preconstruction Survey

Regulatory Notifications

Environmental Manager Qualifications

Employee Training Records

Environmental Protection Plan; G

Dirt and Dust Control Plan

Solid Waste Management Permit
Stormwater Pollution Prevention Plan (SWPPP); G

Stormwater Notice of Intent (for NPDES coverage under the general permit for construction activities)

Spill Prevention Control And Countermeasure (SPCC) Plan; G

SD-06 Test Reports

Monitoring Results; G

Monthly Solid Waste Disposal Report; G

Inspection Reports

Laboratory Analysis

SD-07 Certificates

ECATTS Certificate Of Completion; G

Employee Training Records; G

SD-11 Closeout Submittals

Contractor Hazardous Material Inventory Log; G

Regulatory Notifications; G

Assembled Employee Training Records; G

Solid Waste Management Permit; G

Stormwater Pollution Prevention Plan Compliance Notebook; G

Stormwater Notice of Termination (for NPDES coverage under the general permit for construction activities); G

Waste Determination Documentation; G

Project Solid Waste Disposal Documentation Report; G

Sales Documentation; G

Contractor Certification

Hazardous Waste/Debris Management; G

Disposal Documentation for Hazardous and Regulated Waste; G

Hazardous Waste Inspection Logs; G

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 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. Protect the environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire duration of this Contract. 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.

Tests and procedures assessing whether construction operations comply with Applicable Environmental Laws may be required. Analytical work must be performed by qualified laboratories; and where required by law, the laboratories must be certified.

1.4.1 Training in Environmental Compliance Assessment Training and Tracking System (ECATTS)

1.4.1.1 Personnel Requirements

The Environmental Manager is responsible for environmental compliance on projects. The Environmental Manager must complete applicable ECATTS training modules (installation specific or general) 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 must complete applicable ECATTS training within 14 days of assignment to the project.

1.4.1.2 Certification

Submit an ECATTS certificate of completion for personnel who have completed the required 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 Assessment, Training, and Tracking System, by logging on to https://environmentaltraining.ecatts.com/. Obtain the password for registration from the Contracting Officer.

1.4.1.3 Refresher Training

This training has been structured to allow contractor personnel to receive credit under this contract and to carry forward credit to future contracts. Ensure the 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 required to retake modules tailored to the state where the contract work is being performed.

1.4.2 Conformance with the Environmental Management System

Perform work under this contract consistent with the policy and objectives identified in the installation's Environmental Management System (EMS). Perform work in a manner that conforms to objectives and targets of the environmental programs and operational controls identified by the EMS. Support Government personnel when environmental compliance and EMS audits are conducted by escorting auditors at the Project site, answering questions, and providing proof of records being maintained. Provide monitoring and measurement information as necessary to address environmental performance relative to environmental, energy, and transportation management goals. In the event an EMS nonconformance or environmental noncompliance associated with the contracted services, tasks, or actions occurs, take corrective and preventative actions. In addition, employees must be aware of their roles and responsibilities under the installation EMS and of how these EMS roles and responsibilities affect work performed under the contract.

Coordinate with the installation's EMS coordinator to identify training needs associated with environmental aspects and the EMS, and arrange training or take other action to meet these needs. Provide training documentation to the Contracting Officer. The Installation Environmental Office will retain associated environmental compliance records. Make EMS Awareness training completion certificates available to Government auditors during EMS audits and include the certificates in the Employee Training Records. See paragraph EMPLOYEE TRAINING RECORDS.

1.5 SPECIAL ENVIRONMENTAL REQUIREMENTS

Comply with the special environmental requirements listed here and within project permits such as the Erosion and Sediment Control and Stormwater management permit, general construction permit, utility permits, Installation specific Management Plans, project specific NEPA documentation (signed NEPA Decision Memorandum), and project specific permits. See the Permit Record of Decision Form for a list of necessary permits. Due to the presence of residual petroleum and metals within soil and groundwater at the site, all site workers who come in contact with contaminated soil and groundwater must be 29 CFR 1910.120 HAZWOPER certified personnel with current 8-hr HAZWOPER refresher certificates. All certificates of site workers must be kept on site within the Environmental Manager documentation and submitted as an Appendix within the Environmental Protection Plan and attached at the end of this section.

1.5.1 Mid-Atlantic

Comply with the following state, regional, and local requirements.

1.5.1.1 Virginia

1.5.1.1.1 Excavation

Discrete soil samples for the project site were collected and the analytical test results and a sampling location plan are provided as Attachments to the Design Build RFP. The contractor must expect that excavated soils at the site are impacted by contaminants (including but

not limited to petroleum and metals) and considered characteristic non-hazardous solid waste. All surplus excavated soils must be disposed of at a RCRA Subtitle D lined landfill which will accept the contaminated soils. If RCRA Subtitle D facility is not accepting the soil, the soil should be disposed at RCRA subtitle C.

All surplus excavated soils must be documented within a waste characterization form and manifest as part of the waste determination documentation. The Contractor must develop and submit a Soil Management Plan for review and approval by the Installation Environmental Department and the NAVFAC Environmental Design Specialist. The Soil Management Plan must include the following information:

a. Sampling and Analysis Plan

b. Analytical lab certifications (lab must be ELAP accredited for each analysis)

c. Sample frequency for each analysis

d. Resumes of field sampling team

Due to the presence of petroleum, TPH (GRO and DRO) samples must be collected every 250 cubic yards for offsite disposal. All other waste characterization samples must be collected for every 2,000 cubic yards. This analysis includes ignitability, corrosivity, reactivity, toxicity based on TCLP (metals, VOCs, SVOCs, pesticides and herbicides) results, PCBs, BTEX, TOX, PFAS, and paint filter per validated EPA methods and in accordance with the most recent version of the Department of Defense Quality Systems Manual. All analysis must be completed by a NELAP and VELAP accredited laboratory for each analysis conducted by that lab and all laboratory certifications/accreditations must be current and submitted to the government for review and approval. The only allowable PFAS analytical method for sampling is EPA Method 1633 by a NELAP laboratory accredited for that method. All laboratory analysis results must be submitted to the Government for review and approval. The only authorized department who may sign the waste manifest is NAVFAC MIDLANT EV Services.

If soil is to be reused onsite, sampling is not required unless otherwise directed. Excavated soil may be reused within the construction site with no testing necessary. Excavated soil must be stored in a manner that prevents rain from infiltrating the soil matrix and preventing any runoff into the surrounding soil or pavement or in lined, covered dumpsters. A single contaminated soil stockpile should not contain more than 250 cubic yards. Excavated soil may not be stored on-site for more than 90 days. If soil is to be shipped to a destination outside the fire ant quarantine area (outside of James City County, York County, Chesapeake, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, or Williamsburg) it MUST have a valid inspection certificate issued by an Officer of the Plant Protection and Quarantine Program (PPQ) of the U.S. Department of Agriculture. Contact the Installation Pest Management Coordinator for additional information.

1.5.1.1.2 Imported Fill Requirements

An Imported Fill Management Plan must be reviewed and approved by the Installation Environmental Department through the contracting office; in addition to requirements listed within applicable GEOTECHNICAL, CIVIL and LANDSCAPE ARCHITECTURE specifications for this project. The Imported Fill

Management Plan must include the following information:

a. Fill source location/history (Phase I if available, current aerials, etc.)

b. Sampling and Analysis Plan

c. Analytical lab certifications (lab must be ELAP accredited for each analysis)

d. Sample frequency for each analysis

e. Resumes of field sampling team

f. A table designating screening criteria (Current State clean fill criteria; all PFAS constituent goals are less than the detection limit of the laboratory selected for EPA Method 1633)

Soil Import Sampling Requirements:

At least one REPRESENTATIVE 3-point composite sample from EACH area of planned import must be provided to Installation Environmental and the Environmental Design Specialist DoR for review and approval through the Contracting Officer. If the area of planned import changes, another sample must be collected and provided to Installation Environmental Department and the Environmental for review and approval.

Sample Analysis includes TCL VOCs, TCL SVOCs, TAL metals, and pesticides/herbicides, and PCBs using validated EPA SW846 methods. Additional analysis required is TPH-GRO and TPH-DRO (Method 8015C) and PFAS analysis by EPA Method 1633 in accordance with the most recent version of DoD Quality Systems Manual by a DoD-ELAP accredited laboratory.

PFAS sampling protocols have stringent requirements, very low detection levels, and cross contamination is a concern. PFAS samples must be collected by experienced professional with at least 5 years of experience collecting samples for this extremely sensitive analysis. The resumes provided within the Imported Fill Management Plan will be reviewed in detail by the Navy.

Imported Fill Summary Report must be reviewed and approved by Installation Environmental through the contracting officer prior to any imported material onto the Installation. A minimum of 14 days is required to review and approve results. If imported fill results do not achieve the approved screening criteria provided within the Imported Fill Management Plan, another borrow source must be identified, sampled, and submitted for review. This process will continue until a borrow source that meets the clean fill criteria is met.

The Imported Fill Summary Report must include, but not limited to, the following information:

a. Fill source location/history (Phase I if available, current aerials, etc.)

b. Field Sampling summary (including sample location plan, observations when in the field, COCs, etc)

c. Analytical lab report

d. Sample frequency for each analysis

e. Confirmation of approved sampling team members

f. A table screening fill results to approved screening criteria

g. Schedule of delivery

h. Management of material (including best management of practices to PREVENT cross contamination, on Installation laydown area, etc)

i. A PE/PG recommendation of import

NO MATERIAL is permitted to come onto Installation property without Installation Environmental approval through the Contracting officer.

1.5.1.1.3 Sampling Requirements

A Waste Management and Sampling Plan must be developed and approved by the Installation Environmental Department through the Contracting officer. This plan must define all waste streams, anticipated volumes, waste characterization analysis, lab accreditations, receiving facilities, sample methods, and any additional information to facilitate review and approval.

The publicly accessible DENIX database should be used as a starting point when selecting a laboratory for a project. It does not provide all information needed (e.g., version of method or requirements and list of analyte lists under accreditation). To ensure the laboratory you select is accredited for your project analytes, the project manager/chemist must review the laboratory's scope of accreditation, which is found on their accreditation body's website. To find a DoD-ELAP accredited laboratory, use the following link under the heading "Search Accredited Labs" on the EDQW page on the DENIX website:
https://www.denix.osd.mil/edqw/accreditation/accreditedlabs/index.htm

To determine the version of EPA Method the laboratory is accredited for, the laboratory's DoD-ELAP Scope of Accreditation Certificate must be reviewed and approved by Installation Environmental Department through the Contracting Officer. PFAS sampling protocols have stringent requirements, very low detection levels, and cross contamination is a concern. PFAS samples must be collected by experienced professional with at least 5 years of experience collecting samples for this extremely sensitive analysis. The resumes of the sampling personnel who will collect PFAS analysis for the project must be reviewed and approved the Installation Environmental Department through the Contracting Officer.

1.5.1.1.4 Definition and Disposal Requirements of Empty Paint Cans

Paint Cans: Paint cans that are empty (free of liquids and as defined in 40 CFR 261.7) of paints, solvents, thinners and adhesives may be disposed of in dumpsters.

Metal paint cans that meet the empty standard can be placed in dumpsters marked "metal only"; plastic cans may be placed in solid waste dumpsters. Manage paint cans with liquid or more than one inch of solidified oil-based paint as a hazardous waste and label properly. Manage paint cans with excess water-based paint as non-hazardous waste provided that

they do not contain free liquids or contain any substance with a hazardous characteristic as defined in 40 CFR 261. Contact NAVFAC MIDLANT Environmental Services for management requirements.

1.5.1.1.5 Erosion and Sediment Control Measures and Stormwater Management

1.5.1.1.5.1 Erosion and Sediment Control

Submit an erosion and sediment control plan, and comply with the requirements specified in the Virginia Erosion and Sediment Control Law and Regulations. (Virginia Code: 9 VAC 25-840). Obtain a Certificate of Competency in accordance with 9 VAC 25-850.

1.5.1.1.5.2 Construction Site Stormwater

Construction site stormwater runoff must be treated using proper erosion control measures or stormwater management practices prior to release from the construction site. Pollutants, including but not limited to chemicals, fuels, lubricants, sewage, paints, sedimentation, and other harmful materials must not be discharged into or alongside any river, stream, or impoundment, or into any channels leading to them. Implement appropriate erosion and sediment control measures to all disturbed areas or bare soils to prevent unauthorized offsite sedimentation. Apply stabilization measures to denuded portions of a project that are at final grade or where work has temporarily ceased within 7 days.

1.5.1.1.5.3 Dewatering of Contaminant Impacted Groundwater

All groundwater and stormwater dewatered from excavations are considered contaminant impacted water. The Contractor must prevent stormwater from entering open excavations to the greatest extent possible.

The project requires an AUTHORIZATION TO DISCHARGE UNDER THE VIRGINIA POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT PROGRAM AND THE VIRGINIA STATE WATER CONTROL LAW PERMIT and VPDES GENERAL PERMIT FOR DISCHARGES FROM GROUNDWATER REMEDIATION OF CONTAMINATED SITES, DEWATERING ACTIVITIES OF CONTAMINATED SITES, AND HYDROSTATIC TESTS permits. Permits in addition to the General Construction Permit are due to the presence of contaminants in shallow groundwater (including petroleum, BTEX, metals) when working within the contaminant impacted groundwater table (all groundwater within the project limits is impacted by contaminants for this project).

The contractor must submit a Dewatering Work Plan that describes means, methods, type of treatment, location of discharge, estimate flow and treatment rate, containment tanks, etc in accordance with Earthwork specification for review and acknowledgement by the Installation Environmental Department and NAVFAC EDS. The contractor is responsible for completion and submittal of the permit application package and any associated fees. State Approval of the dewatering permit may take up to 90 days and must be received prior to dewatering activities and prior to mobilizing dewatering treatment equipment to the site. The contractor is responsible for fulfilling all permit requirements, meeting discharge criteria, and submitting all required monitoring results reports to the Contracting Officer and VDEQ. Any failure to do so or resulting notice of violation issued is the sole responsibility of the contractor.

All requirements within the contractors VPDES permit must be met. The contractor must collect a performance treatment sample prior to the compliance discharge point of the treatment system a minimum of once per

week when the system is operating to ensure treatment of any contaminants to required discharge concentrations. The analytical results must be collected by an experienced professional with a minimum of 3 years of experience dealing with environmental sampling methods and treatment. PFAS data must be collected per EPA standard operating procedures, analyzed by a NELAP certified lab for that method, and in accordance with the latest version of the DoD QSM. Only EPA Method 1633 is permitted for this type of sampling. Discussion and approval of appropriate sample methods, sampling staff, analytical laboratory, and distribution of data must be clearly documented within the Environmental Protection Plan and Dewatering Plans for approval by the Installation Environmental Staff and Environmental Design Specialist. All cost of running treatment systems throughout the duration of dewatering required for this project must be included within the base bid.

1.5.1.1.6 Virginia Stormwater Management

Where land disturbance is equal to or exceeds one acre, prepare and submit a Stormwater Pollution Prevention Plan (SWPPP) and comply with the requirements specified in the Virginia Stormwater Management Law and Regulations (Virginia Code: 9 VAC 25-870). Obtain Certificate of Competency in accordance with 9 VAC 25-850.

1.5.1.1.6.1 Stormwater General Permit for Construction Activities Registration Statement

In accordance with 9 VAC 25-870, submit a Registration Statement to the State to obtain Virginia Stormwater Management Program General Permit coverage, and as required under the General Permit, develop a SWPPP for the project. The SWPPP must meet the requirements of the State General Permit for storm water discharges from construction activities. Submit the Registration Statement and appropriate permit fees to the appropriate state agency for approval a minimum of 15 calendar days prior to the start of any land disturbing activities. Maintain an approved copy of the SWPPP at the onsite construction office, and continually update as regulations require, reflecting current site conditions.

Coverage under this permit requires the Contractor to prepare a SWPPP, prepare and submit a Registration Statement and provide the permit fee to the responsible state agency before any land disturbing activities begin. File for permit coverage on behalf of both the Contractor and the Construction Officer, and file a Notice of Termination once construction is complete and the site is stabilized with a final sustainable cover. Install, inspect, maintain best management practices (BMPs), and submit stormwater BMP inspection reports and SWPPP inspection reports as required under the terms and conditions of the permit. Ensure construction operations and management comply with the terms and conditions of the general permit for stormwater discharges from construction activities.

1.5.1.1.6.2 Stormwater General Permit Inspection Reports

Complete and document, in the SWPPP Notebook, the Stormwater Inspection Reports as required by the State VSMP General Permit. The Stormwater inspections reports must include items required by the General Permit and must be completed at the inspection frequency detailed in 9 VAC 25-870. Obtain certificate of competency in accordance with 9 VAC 25-850.

1.5.1.1.7 Asbestos Abatement and Notification Procedures

Structures must be surveyed for the presence of asbestos prior to demolition or renovation in accordance with 40 CFR 61.145. A structure is defined as including any load-bearing portion of a structure. The survey must be performed by a licensed, certified, accredited asbestos inspector in accordance with ASTM E2356.

Notify EPA and Virginia Department of Labor and Industry (VADOLI) at least 20 calendar days before start of asbestos abatement if asbestos is expected to total at least 260 linear feet, 160 square feet, or 35 cubic feet. Provide copies of notifications to the environmental office (Air Manager) through the Contracting Officer prior to beginning work. Make notifications for any project that includes asbestos abatement (and for all demolition projects, regardless of whether asbestos containing materials are present in the structure or facility) in accordance with paragraph DEMOLITION. Notification is not required if asbestos is nonfriable asbestos containing roofing, flooring, or siding materials that when installed, encapsulated, or removed do not become friable. If the material is damaged, the matrix binding the asbestos fibers has deteriorated, or mechanical removal results in more-than-incidental breakage, then notification is required. Activities such as grinding, mechanical chipping, sawing or drilling can make the asbestos containing material friable and would require notification.

1.5.1.1.7.1 Best Management Practices

Use BMPs to ensure EPA and VADOLI requirements are met, including: preventing airborne emissions via wetting asbestos prior to removal; using glove bags or containment; using HEPA-filtered vacuum or ventilation systems; restricting access to asbestos-control areas until thoroughly cleaned and inspected, and acceptable air-samples have been received. Consideration should be given to other environmental program requirements such as Clean Water Act (CWA) requirements when making decisions regarding BMPs.

1.5.1.1.7.2 Asbestos Waste Disposal

For asbestos waste disposal, phone the NAVFAC MIDLANT Environmental (EV) Service Desk to arrange pick up in your area. A manifest must be signed by this office prior to waste being removed from the installation. Provide copies of manifests and notifications to NAVFAC Mid-Atlantic EV Hazardous Waste (HW) Program Manager.

1.5.1.1.8 Hazardous Waste Requirements for Virginia Installations

1.5.1.1.8.1 Demolition

Remove the following items from the site prior to demolition: polychlorinated biphenyls (PCBs), fluorescent bulbs, mercury and metal components (such as furnaces, ducts, and piping), and any hazardous materials. Manage lead, fluorescent bulbs, mercury-containing equipment, and any other waste as "hazardous or universal waste" as appropriate (see paragraph HAZARDOUS AND UNIVERSAL WASTE GENERATION). If the demolition activity encompasses the whole building (the building must be demolished to the ground), the resulting construction debris (including lead paint) requires Toxicity Characteristic Leaching Procedure (TCLP) analysis to make a waste determination and ensure proper management and disposal before it can be disposed as solid waste.

1.5.1.1.8.2 Hazardous and Universal Waste Generation

Hazardous and Universal Waste includes fluorescent bulbs, PCB ballast, lead paint, and mercury-containing equipment. Contact the EV HW Program Manager to set up an appropriate accumulation area. Manage waste in a satellite accumulation area (SAA), hazardous waste accumulation area (HWAA), or universal waste accumulation area (UWAA) as directed by the EV HW Program Manager through the Contracting Officer. Keep containers securely closed unless adding or removing material and waste. Ensure custodians managing the accumulation area(s) have appropriate training that has been taken within the year prior to the area being established. Training is an annual requirement that can be taken on the https://environmentaltraining.ecatts.com/ site. Keep copies of training records and certificates on site.

Hazardous Waste Accumulation Areas (less than 90-day sites) require Virginia Department of Environmental Quality (VDEQ) notification. Notify the HA Media Manager (HW MM) 14 days prior to the start of waste accumulation. The EV HW Program Manager is authorized to notify VDEQ when Hazardous Waste Accumulation Areas are established. A copy of the Activity Hazardous Material Reutilization, Hazardous Waste Minimization and Disposal Guide will be provided by the Contracting Officer. For waste disposal, phone the NAVFAC MIDLANT EV Service Desk to arrange pick up in your area. Fax a completed DD 1348-1A to the Service Desk for all waste turn-ins. Notify the Service Desk if any containers are leaking or are in poor condition. A representative from NAVFAC MIDLANT EV Services is the authorized entity approved to sign manifests for off-site waste disposal.

1.5.1.1.8.3 Waste Management - Disposal by the Contractor

Manage and dispose of all Hazardous Waste generated or discovered during the project. Dispose of all waste in accordance with all federal and state environmental regulations. Sign and submit all paperwork (lab analyses, profiles, manifests) and records to the Navy. Allow inspection by the Regional Environmental Core for compliance with federal, state and Navy requirements.

1.5.1.1.8.3.1 Contractor Site Custodian

a. Designate a Site Custodian and an Alternate for waste management. Provide 24-hour phone numbers where Site Custodian and alternate can be contacted in the event of an emergency.

b. Personnel must be trained in hazardous waste management procedures to comply with the requirements of 40 CFR 262.34 and 40 CFR 265.16.

1.5.1.1.8.3.2 Waste Accumulation

a. Establish a SAA, UWAA or a temporary 90-Day HWAA for waste accumulation. Obtain the HW Media Manager approval. Do not use accumulation areas as lay-down areas.

b. EV Core HW MM will notify VDEQ. Notify the HW MM 14 days prior to the start of waste accumulation. All agency notifications will originate from the Regional Environmental Core.

c. The Site Custodian and Alternate must attend the HW MM training session for the management of the SAA, UWAA or HWAA.

1.5.1.1.8.3.3 Waste Disposal

a. The Navy will be considered the "generator" for all wastes that are generated on Navy property, regardless if the waste was generated as result of Contractor activity.

b. Pack, mark, label and transport all waste in accordance with Department of Transportation 49 CFR Regulations.

c. Obtain the EPA Hazardous Waste Identification Number (EPA ID#) for the installation or off-site Contractor location, from the EV Core HW MM. Use the generator's EPA ID# on the Hazardous Waste Manifest.

   (1) Provide the name and EPA ID Number for the Hazardous Waste Transporter and the disposal facility to the HW MM.

   (2) Submit all waste profiles and documentation supporting the waste disposal to the HW MM for review.

d. Obtain the Hazardous Waste Manifest signature from designated representative of the Regional Environmental Services Group (EV Services). Contact the Environmental Services Department Dispatcher to schedule this service. Obtain signature on the day the waste is scheduled to be picked up.

e. The Contractor is to ensure that the Certificates of Disposal and Manifests are mailed to EV Services, in accordance with the all Federal and State regulations.

1.5.1.1.8.4 Excavation

Excavated soil in which the results indicate the soils are characteristic hazardous waste must be stored separately. The Installation Hazardous Waste Media manager must be informed immediately of results and setup an appropriate location to store material. The material may not be stored in excess of 90 days. Soils are not anticipated to be characteristic hazardous waste for this project.

If during excavation of soils any visible and /or odor/smell of petroleum contamination is encountered, excavation operations should stop, and the Installation Environmental Department should be contacted immediately.

1.5.1.1.8.5 Investigation Derived Waste

For any geotechnical investigation and monitoring well installation drilling spoils and liquids that cannot be returned to the boreholes, containerize and store surplus material in 55 gallon, DOT approved, chemical resistant drums and manage as investigation derived waste (IDW). The IDW liquids and solids must be containerized separately to the greatest extent possible. Coordinate with the Installation Environmental Department to establish a location for a Central Accumulation Area (CAA) to store the IDW drums until characterization, manifest, and removal of the IDW drums is complete.

1.5.1.1.8.6 Painting and Paint Removal

Air-drying cans for disposal are allowed only if liquid residue is less than one inch; keep all paint or solvent containers closed and secured

when not adding or removing material or waste. Waste paint chips and debris must be collected and sampled to determine the proper disposal method. Contact the NAVFAC MIDLANT EV HW Program Manager for sampling requirements. If waste paint is determined to be hazardous, waste must be managed as hazardous and an appropriate accumulation area must be established. Contact the NAVFAC MIDLANT EV HW Program Manager for site setup.

1.5.1.1.8.7 Dumpsters

Label trash containers to appropriately describe the contents.

1.5.1.1.9 Air Requirements

1.5.1.1.9.1 Concrete Crushing

Secure an air permit for the crusher from the regulatory agency where the equipment is home-based (in Virginia contact VADEQ). Provide a copy of the permit to the EV Office (Air Program Manager) through the Contracting Officer at least 30 days prior to bringing crusher onsite.

1.5.1.1.10 Spill Response and Reporting

Report spills at Hampton Roads Navy installations to the appropriate Regional Dispatch Center (RDC) immediately upon discovery.

After notifying the installation ECC, notify the Navy point of contact. Refer to the Installation Hazardous Material Reutilization, Hazardous Waste Minimization and Disposal Guide Appendix 3 for spill contact procedures. Refer to Table 1 - Spill Reporting Contact Number for the appropriate point of contact.

1.5.2 Material Storage

Store plastic bags in 55 gallon covered drum(s). Do not seal the drum(s). Provide a label with a description of the contents and note on the label "TO BE DISPOSED OF BY RASO". Apply the label to the exterior surface of the cover and site of the drum(s). Provide a record copy of the label for each drum storage material inventory to the Contracting Officer.

1.6 QUALITY ASSURANCE

1.6.1 Preconstruction Survey and Protection of Features

This paragraph supplements the Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS. Prior to start of any onsite construction activities, 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. Include in the report a plan describing the features requiring protection under the provisions of the Contract Clauses, which are not specifically identified on the drawings as environmental features requiring protection along with the condition of trees, shrubs and grassed areas immediately adjacent to the site of work and adjacent to the Contractor's assigned storage area and access route(s), as applicable. The Contractor and the Contracting Officer will sign this survey report upon mutual agreement regarding its accuracy and completeness. Protect those environmental features included in the survey

report and any indicated on the drawings, regardless of interference that their preservation may cause to the work under the Contract.

1.6.2 Regulatory Notifications

Provide regulatory notification requirements in accordance with federal, state and local regulations. In cases where the Government will also provide public notification (such as stormwater permitting), coordinate with the Contracting Officer. Submit copies of regulatory notifications to the Contracting Officer at least 14 days 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, construction, removal or use of a permitted air emissions source, and remediation of controlled substances (asbestos, hazardous waste, lead paint).

1.6.3 Environmental Brief

Attend an environmental brief to be included in the preconstruction meeting that includes the CM, ET, Installation Environmental Department, NAVFAC Environmental Design Specialist, NAVFAC Geotechnical Engineer, and NAVFAC Civil Engineer. Provide the following information: types, quantities, and use of hazardous materials that will be brought onto the installation; and 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 installation Environmental Office to discuss the proposed Environmental Protection Plan (EPP) or equipment local requirement. Develop a mutual understanding relative to the details of environmental protection, including measures for protecting natural and cultural resources, required reports, required permits, permit requirements (such as mitigation measures), and other measures to be taken.

1.6.4 Environmental Manager

Appoint in writing an Environmental Manager for the project site. The Environmental Manager is directly responsible for coordinating contractor compliance with federal, state, local, and installation requirements. The Environmental Manager must ensure compliance with Hazardous Waste Program requirements (including hazardous waste handling, storage, manifesting, and disposal); implement the EPP; ensure environmental permits are obtained, maintained, and closed out; ensure compliance with Stormwater Program 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 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. Submit Environmental Manager Qualifications to the Contracting Officer.

1.6.5 Employee Training Records

Prepare and maintain Employee Training Records throughout the term of the contract meeting applicable 40 CFR requirements. Provide Employee Training Records in the Environmental Records Binder. Submit these Assembled Employee Training Records to the Contracting Officer at the conclusion of the project, unless otherwise directed.

Train personnel to meet EPA and state requirements. Conduct environmental protection/pollution control meetings for personnel prior to commencing construction activities. Conduct additional meetings for new personnel and when site conditions change. Include in the training and meeting agenda: methods of detecting and avoiding pollution; familiarization with statutory and contractual pollution standards; installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of archaeological sites, artifacts, waters of the United States, and endangered species and their habitat that are known to be in the area.

1.6.6 Non-Compliance Notifications

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with federal, state or local environmental laws or regulations, permits, and other elements of the Contractor's EPP. After receipt of such notice, inform the Contracting Officer of the proposed corrective action and take such action when approved by the Contracting Officer. The Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. FAR 52.242-14 Suspension of Work provides that a suspension, delay, or interruption of work due to the fault or negligence of the Contractor allows for no adjustments to the contract for time extensions or equitable adjustments. In addition to a suspension of work, the Contracting Officer may use additional authorities under the contract or law.

1.7 ENVIRONMENTAL PROTECTION PLAN

The purpose of the EPP is to present an overview of known or potential environmental issues that must be considered and addressed during construction. Incorporate construction related objectives and targets from the installation's EMS into the EPP. Include in the EPP measures for protecting natural and cultural resources, required reports, and other measures to be taken. Meet with the Contracting Officer or Contracting Officer Representative to discuss the EPP and develop a mutual understanding relative to the details for environmental protection including measures for protecting natural resources, required reports, and other measures to be taken. Submit the EPP within 15 days after notice to proceed and not less than 10 days before the preconstruction meeting. Submit the EPP not less than 60 calendar days before scheduled final site or building design approval. The EPP must incorporate and address all comments associated with a project's environmental review (NEPA) documentation (Environmental Checklist, Environmental Condition of Property Checklist, Work Permit, etc.). Revise the EPP throughout the project to include any reporting requirements, changes in site conditions, or contract modifications that change the project scope of work in a way that could have an environmental impact. No requirement in this section will relieve the Contractor of any applicable federal, state, and local environmental protection laws and regulations. During Construction,

identify, implement, and submit for approval any additional requirements to be included in the EPP. Maintain the current version onsite.

The EPP includes, but is not limited to, the following elements:

1.7.1 General Overview and Purpose

1.7.1.1 Descriptions

A brief description of each specific plan required by environmental permit or elsewhere in this Contract such as stormwater pollution prevention plan, spill control plan, solid waste management plan, air pollution control plan, contaminant prevention plan, a historical, archaeological, cultural resources, biological resources and wetlands plan, traffic control plan Hazardous, Toxic and Radioactive Waste (HTRW) Plan.

1.7.1.2 Duties

The duties and level of authority assigned to the person(s) on the job site who oversee environmental compliance, such as who is responsible for adherence to the EPP, who is responsible for spill cleanup and training personnel on spill response procedures, who is responsible for manifesting hazardous waste to be removed from the site (if applicable), and who is responsible for training the Contractor's environmental protection personnel.

1.7.1.3 Procedures

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.

1.7.1.4 Communications

Communication and training procedures that will be used to convey environmental management requirements to Contractor employees and subcontractors.

1.7.1.5 Contact Information

Emergency contact information contact information (office phone number, cell phone number, and e-mail address).

1.7.2 General Site Information

1.7.2.1 Drawings

Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, jurisdictional wetlands, material storage areas, structures, sanitary facilities, storm drains and conveyances, and stockpiles of excess soil.

1.7.2.2 Work Area

Work area plan showing the proposed activity in each portion of the area and identify the areas of limited use or nonuse. Include measures for marking the limits of use areas, including methods for protection of features to be preserved within authorized work areas and methods to control runoff and to contain materials on site, and a traffic control

plan.

Show where any fuels, hazardous substances, solvents, or lubricants will be stored. Provide a spill plan to address any releases of those materials.

1.7.2.3 Documentation

A letter signed by an officer of the firm appointing the Environmental Manager and stating that person 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.

1.7.3 Management of Natural Resources

a. Land resources

b. Tree protection

c. Replacement of damaged landscape features

d. Temporary construction

e. Stream crossings

f. Fish and wildlife resources

g. Wetland areas

1.7.4 Protection of Historical and Archaeological Resources

a. Objectives

b. Methods

1.7.5 Stormwater Management and Control

a. Ground cover

b. Erodible soils

c. Temporary measures

(1) Structural Practices

(2) Temporary and permanent stabilization

d. Effective selection, implementation and maintenance of Best Management Practices (BMPs).

e. Stormwater Pollution Prevention Plan (SWPPP).

1.7.6 Protection of the Environment from Waste Derived from Contractor Operations

This item consists of the management procedures for hazardous waste to be generated. The elements of those procedures will coincide with the Installation Hazardous Waste Management Plan when within an installation.

The Contracting Officer will provide a copy of the Installation Hazardous Waste Management Plan as applicable.

As a minimum, include the following:

a. List of the types of hazardous wastes expected to be generated

b. Procedures to ensure a written waste determination is made for appropriate wastes that are to be generated

c. Sampling/analysis plan, including laboratory method(s) that will be used for waste determinations and copies of relevant laboratory certifications

d. Methods and proposed locations for hazardous waste accumulation/storage (that is, in tanks or containers)

e. Management procedures for storage, labeling, transportation, and disposal of waste (treatment of waste is not allowed unless specifically noted)

f. Management procedures and regulatory documentation ensuring disposal of hazardous waste complies with Land Disposal Restrictions (40 CFR 268)

g. Management procedures for recyclable hazardous materials such as lead-acid batteries, used oil, and similar

h. Used oil management procedures in accordance with 40 CFR 279; Hazardous waste minimization procedures

i. Plans for the disposal of hazardous waste by permitted facilities; and Procedures to be employed to ensure required employee training records are maintained.

1.7.7 Prevention of Releases to the Environment

Procedures to prevent releases to the environment

Notifications in the event of a release to the environment

1.7.8 Regulatory Notification and Permits

List what notifications and permit applications must be made. Some permits require up to 180 days to obtain. Demonstrate that those permits have been obtained or applied for by including copies of applicable environmental permits. The EPP will not be approved until the permits have been obtained.

1.7.9 Clean Air Act Compliance

1.7.9.1 Haul Route

Submit truck and material haul routes along with a Dirt and Dust Control Plan for controlling dirt, debris, and dust on Installation 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.

1.7.9.2 Pollution Generating Equipment

Identify air pollution generating equipment or processes that may require federal, state, or local permits under the Clean Air Act. Determine requirements based on any current installation permits and the impacts of the project. Provide a list of all fixed or mobile equipment, machinery or operations that could generate air emissions during the project to the Installation Environmental Office (Air Program Manager). Ensure required permits are obtained prior to installing and operating applicable equipment/processes.

1.7.9.3 Stationary Internal Combustion Engines

Identify portable and stationary internal combustion engines that will be supplied, used or serviced. Comply with 40 CFR 60 Subpart IIII, 40 CFR 60 Subpart JJJJ, 40 CFR 63 Subpart ZZZZ, and local regulations as applicable. At minimum, include the make, model, serial number, manufacture date, size (engine brake horsepower), and EPA emission certification status of each engine. Maintain applicable records and log hours of operation and fuel use. Logs must include reasons for operation and delineate between maintenance/testing, emergency, and non-emergency operation. Contractor must supply required information to the Air Program Manager at least 30 days prior to bringing engines on-site.

1.7.9.4 Refrigerants

Identify management practices to ensure that heating, ventilation, and air conditioning (HVAC) work involving refrigerants complies with 40 CFR 82 requirements. Technicians must be certified, maintain copies of certification on site, use certified equipment and log work that requires the addition or removal of refrigerant. Any refrigerant reclaimed is the property of the Government, coordinate with the Installation Environmental Office to determine the appropriate turn in location.

1.7.9.5 Air Pollution-engineering Processes

Identify planned air pollution-generating processes and management control measures (including, but not limited to, spray painting, abrasive blasting, demolition, material handling, fugitive dust, and fugitive emissions). Log hours of operations and track quantities of materials used.

1.7.9.6 Compliant Materials

Provide the Government a list of SDSs for all hazardous materials proposed for use on site. Materials must be compliant with all Clean Air Act regulations for emissions including solvent and volatile organic compound contents, and applicable National Emission Standards for Hazardous Air Pollutants requirements. The Government may alter or limit use of specific materials as needed to meet installation permit requirements for emissions.

1.8 LICENSES AND PERMITS

Obtain licenses and permits required for the construction of the project and in accordance with FAR 52.236-7 Permits and Responsibilities. Notify the Government of all equipment that may require permits or special approvals that the Contractor plans to use on site. This paragraph supplements the Contractor's responsibility under FAR 52.236-7 Permits and

Responsibilities.

1.9 ENVIRONMENTAL RECORDS BINDER

Maintain on-site a separate three-ring Environmental Records Binder and submit at the completion of the project. Make separate parts within the binder that correspond to each submittal listed under paragraph CLOSEOUT SUBMITTALS in this section.

1.10 SOLID WASTE MANAGEMENT PERMIT

Provide the Contracting Officer with written notification of the quantity of anticipated solid waste or debris that is anticipated or estimated 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 from the receiving location or as applicable; submit one copy of the receiving location state and local Solid Waste Management Permit or license showing such agency's approval of the disposal plan before transporting wastes off Government property.

1.10.1 Monthly Solid Waste Disposal 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.

1.11 FACILITY HAZARDOUS WASTE GENERATOR STATUS

Naval Air Station Oceana Dam Neck Annex is designated as a Large Quantity Generator. Meet the regulatory requirements of this generator designation for any work conducted within the boundaries of this Installation. Comply with provisions of federal, state, and local regulatory requirements applicable to this generator status regarding training and storage, handling, and disposal of construction derived wastes.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PROTECTION OF NATURAL RESOURCES

Minimize interference with, disturbance to, and damage to fish, wildlife, and plants, including their habitats. Prior to the commencement of activities, consult with the Installation Environmental Office as applicable, regarding rare species or sensitive habitats that need to be protected. The protection of rare, threatened, and endangered animal and plant species identified, including their habitats, is the Contractor's responsibility.

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 that is consistent with the requirements of the Installation Environmental Office or as otherwise specified. Confine construction activities to within the limits of the work indicated or specified.

3.1.1 Flow Ways

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 specified and permitted.

3.1.2 Vegetation

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 is responsible for any resultant damage.

Protect existing trees and critical root zones (CRZ) that are to remain to ensure they are not injured, bruised, defaced, or otherwise damaged by construction operations. Remove displaced rocks from uncleared areas. Coordinate with the Contracting Officer and Installation Environmental Office to determine appropriate action for trees and other landscape features scarred or damaged by equipment operations.

Avoid clearing of trees 3 in DBH or greater during the months of June and July. Conduct vegetation clearing actions during the months of March, August, September, October, and November. Ensure no bald eagle nests are located within 660 ft of tree clearing activities. Clearing activities outside of the aforementioned times will require the contractor to conduct additional wildlife survey work and may result in work stoppage if protected species are located on site.

Use native to the local area plant species for landscaping or repairing vegetated landscapes. When working on Installations where aviation activities occur select native vegetation that minimal Bird/Wildlife Aircraft Strike Hazards (BASH) attraction concerns. Vegetation planting lists should be reviewed and approved by the Installation Natural Resources Manager before being authorized for purchase and planting.

Heavy equipment and materials should not be stored within the drip-line of trees. Utilize proper pruning/trimming techniques to avoid damaging or weakening trees. Project should follow the Installation's Integrated Natural Resources Management Plan guidance regarding protection of trees.

3.1.3 Streams

Stream crossings must allow movement of materials or equipment without violating water pollution control standards of the federal, state, and local governments. Construction of stream crossing structures must be in compliance with all required permits including, but not limited to, Clean Water Act Section 404, and Section 401 Water Quality.

The Contracting Officer's approval and appropriate permits are 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.

Stream crossings should be constructed as clear-span bridges. However, if

this is not possible and culverts must be utilized, countersink culverts below the streambed at least 6 in (15 cm), or use bottomless culverts, to allow passage of aquatic organisms. Ensure use of floodplain culverts to carry bankfull discharges.

3.1.4 Wildlife

Unless contracted specifically to do so, do not approach wildlife, do not try to touch or relocate wildlife, DO NOT KILL wildlife. For on base wildlife emergency issues, contact the Installation Command Duty Officer (CDO) and they will contact Installation Natural Resources staff to address the wildlife concern (animals only, not plants).

Feeding, harboring, harassment, collecting, killing, and/or releasing of animals/wildlife and plants on the installation is prohibited without obtaining authorized permits. Precautions should be taken to prevent negative impacts from coming in contact with wildlife.

This base is known to have poisonous plants (i.e., poison ivy), venomous snakes (i.e., copperhead and cottonmouth), bees/wasps/hornets, ticks, mosquitoes, rabid animals, etc.

Report observations of Endangered Species Act protected species, Bald Eagle Nests, Feral Hogs, Noxious weeds https://www.aphis.usda.gov/aphis/ourfocus/planthealth/plant-pest-and-disease-programs/pests-and-diseases/sa_weeds/sa_noxious_w
USDA Identified Hungry Pests https://www.aphis.usda.gov/aphis/resources/pests-diseases/hungry-pests and other non-native invasive species https://www.invasivespeciesinfo.gov/about-invasive-species to the Installation Natural Resources Manager.

3.2 STORMWATER

Do not discharge stormwater from construction sites to the sanitary sewer. If the water is noted or suspected of being contaminated, it may only be released to the storm drain system if the discharge is specifically permitted. Obtain authorization in advance from the Installation Environmental Office for any release of contaminated water.

3.2.1 Construction General Permit

Provide a Construction General Permit as required by 40 CFR 122.26 or the State of Virginia General Permit. Under the terms and conditions of the permit, install, inspect, maintain BMPs, prepare stormwater erosion and sediment control inspection reports, and submit SWPPP inspection reports. Maintain construction operations and management in compliance with the terms and conditions of the general permit for stormwater discharges from construction activities.

3.2.1.1 Stormwater Pollution Prevention Plan

Submit a project-specific Stormwater Pollution Prevention Plan (SWPPP) to the Contracting Officer for approval, within 30 days of Contract Award and prior to the commencement of work. The SWPPP must meet the requirements of 40 CFR 122.26 and the Virginia State General Permit for stormwater discharges from construction sites.

Include the following:

a. Comply with terms of the state general permit for stormwater discharges from construction activities. Prepare SWPPP in accordance with state requirements. Use EPA guide Developing your Stormwater Pollution Prevention Plan located at https://www.epa.gov/npdes/developing-stormwater-pollution-prevention-plan-swppp to prepare the SWPPP.

b. Select applicable BMPs from EPA Fact Sheets located at https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater#constr or in accordance with applicable state or local requirements.

c. Include a completed copy of the Notice of Intent, BMP Inspection Report Template, and Stormwater Notice of Termination, except for the effective date.

d. Comply with local additional requirements.

3.2.1.2 Stormwater Notice of Intent for Construction Activities

Prepare and submit the Notice of Intent for NPDES coverage under the general permit for construction activities to the Contracting Officer for review and approval.

Submit the approved NOI and appropriate permit fees onto the appropriate federal or state agency for approval. No land disturbing activities may commence without permit coverage. Maintain an approved copy of the SWPPP at the onsite construction office, and continually update as regulations require, reflecting current site conditions.

Comply with additional state and local requirements.

3.2.1.3 Inspection Reports

Submit "Inspection Reports" to the Contracting Officer in accordance with the State of Virginia Construction General Permit.

3.2.1.4 Stormwater Pollution Prevention Plan Compliance Notebook

Create and maintain a three ring binder of documents that demonstrate compliance with the Construction General Permit. Include a copy of the permit Notice of Intent, proof of permit fee payment, SWPPP and SWPPP update amendments, inspection reports and related corrective action records, copies of correspondence with the State Permitting Agency, and a copy of the permit Notice of Termination in the binder. At project completion, the notebook becomes property of the Government. Provide the compliance notebook to the Contracting Officer.

3.2.1.5 Stormwater Notice of Termination for Construction Activities

Submit a Notice of Termination to the Contracting Officer for approval once construction is complete and final stabilization has been achieved on all portions of the site for which the permittee is responsible. Once approved, submit the Notice of Termination to the appropriate state or federal agency.

3.2.2 Erosion and Sediment Control Measures

Provide erosion and sediment control measures in accordance with state and local laws and regulations. Preserve vegetation to the maximum extent practicable.

Erosion control inspection reports may be compiled as part of a stormwater pollution prevention plan inspection reports.

3.2.2.1 Erosion Control

Prevent erosion by mulching, Compost Blankets, Geotextiles. Stabilize slopes by sodding, seeding, or such combination of these methods necessary for effective erosion control. Use of hay bales is prohibited.

3.2.2.2 Sediment Control Practices

Implement sediment control practices to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Implement sediment control practices prior to soil disturbance and prior to creating areas with concentrated flow, during the construction process to minimize erosion and sediment laden runoff. Include the following devices: silt fence, storm drain inlet protection. Location and details of installation and construction are indicated on the drawings.

3.2.3 Work Area Limits

Mark the areas that need not be disturbed under this Contract prior to commencing construction activities. Mark or fence isolated areas within the general work area that are not to be disturbed. Protect monuments and markers before construction operations commence. Where construction operations are to be conducted during darkness, all markers must be visible in the dark. Personnel must be knowledgeable of the purpose for marking and protecting particular objects.

3.2.4 Contractor Facilities and Work Areas

Place field offices, staging areas, stockpile storage, and temporary buildings in areas designated on the drawings or as directed by the Contracting Officer. Move or relocate the Contractor facilities only when approved by the Government. Provide erosion and sediment controls for onsite borrow and spoil areas to prevent sediment from entering nearby waters. Control temporary excavation and embankments for plant or work areas to protect adjacent areas.

3.2.5 Municipal Separate Storm Sewer System (MS4) Management

Comply with the Installation's MS4 permit requirements. Comply with State MS4 regulations dependent on ground-disturbance square fottage.

3.3 SURFACE AND GROUNDWATER

3.3.1 Cofferdams, Diversions, and Dewatering

Construction operations for dewatering must be constantly controlled to maintain compliance with existing state water quality standards and designated uses of the surface water body. Comply with the State of Virginia water quality standards and anti-degradation provisions. Do not

discharge excavation ground water to the sanitary sewer, storm drains, or to surface waters without prior specific authorization in writing from the Installation Environmental Office or Contracting Officer. Discharge of hazardous substances will not be permitted under any circumstances. Use sediment control BMPs to prevent construction site runoff from directly entering any storm drain or surface waters. Comply with construction site stormwater and Dewatering of Contaminant Impacted Groundwater sections above.

The discharge of contaminant impacted groundwater treated by an approved treatment system will be required for this project and the appropriate permit must be received prior to any dewatering activities. Anticipated contaminants include, but are not limited to petroleum and metals. The minimum requirements for any necessary dewatering for this project includes a generator, pump and treatment system rated as necessary for dewatering purposes. The treatment system to include GAC filters able to treat any perched and/or contaminated groundwater at the site for the duration of the dewatering effort. Change out of the treatment media is the sole responsibility of the contractor. All spent treatment media must be characterized, transported, and disposed at a subtitle C landfill or Subtitle D lined landfill, which is authorized to accept the groundwater. The Contracting Officer and/or Installation Environmental Office reserve the right to all analytical results, request additional testing, and halt construction operations if tests fail, at no additional cost to the contractor.

Upon discovery of any pollutant released into the environment (surface or water), The Regional Dispatch Center (RDC) must be called immediately at 757-433-9111.

3.3.2 Waters of the United States

Do not enter, disturb, destroy, or allow discharge of contaminants into waters of the United States. Upon discovery of any pollutant released into the environment (surface or water), The Regional Dispatch Center (RDC) must be called immediately at 757-433-9111.

3.4 PROTECTION OF CULTURAL RESOURCES

3.4.1 Archaeological Resources

If, during excavation or other construction activities, any previously unidentified or unanticipated historical, archaeological, and cultural resources are discovered or found, activities that may damage or alter such resources will be suspended. Resources covered by this paragraph include, but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rock or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, immediately notify the Contracting Officer so that the appropriate authorities may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. Cease all activities that may result in impact to or the destruction of these resources. Secure the area and prevent employees or other persons from trespassing on, removing, or otherwise disturbing such resources. The Government retains ownership and control over archaeological resources.

3.4.2 Historical Resources

Existing historical resources within the work area are shown on the drawings. Protect these resources and be responsible for their preservation during the life of the Contract.

3.5 AIR RESOURCES

Equipment operation, activities, or processes will be in accordance with 40 CFR 64 and state air emission and performance laws and standards.

3.5.1 Preconstruction Air Permits

Notify the Air Program Manager, through the Contracting Officer, at least 6 months prior to bringing equipment, assembled or unassembled, onto the Installation, so that air permits can be secured. Necessary permitting time must be considered in regard to construction activities. Clean Air Act (CAA) permits must be obtained prior to bringing equipment, assembled or unassembled, onto the Installation.

Permits will be provided by the Government.

3.5.2 Oil or Dual-fuel Boilers and Furnaces

Provide product data and details for new, replacement, or relocated fuel fired boilers, heaters, or furnaces to the Installation Environmental Office (Air Program Manager) through the Contracting Officer. Data to be reported include: equipment purpose (water heater, building heat, process), manufacturer, model number, serial number, fuel type (oil type, gas type) size (MMBTU heat input). Provide in accordance with paragraph PRECONSTRUCTION AIR PERMITS.

3.5.3 Burning

Burning is prohibited on the Government premises.

3.5.4 Class I and II ODS Prohibition

Class I and II ODS are Government property and must be returned to the Government for appropriate management. Coordinate with the Installation Environmental Office to determine the appropriate location for turn in of all reclaimed refrigerant.

3.5.5 Venting of Refrigerant

Accidental venting of a refrigerant is a release and must be reported immediately to the Contracting Officer. Intentional venting of refrigerants (including most Non-ODS substitute refrigerants) is prohibited per 40 CFR 82.

3.5.6 EPA Certification Requirements

Heating and air conditioning technicians must be certified through an EPA-approved program. Maintain copies of certifications at the employees' places of business; technicians must carry certification wallet cards, as provided by environmental law.

3.5.7 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. Since these products contain Crystalline Silica, comply with the applicable OSHA standard, 29 CFR 1910.1053 or 29 CFR 1926.1153 for controlling exposure to Crystalline Silica Dust.

3.5.7.1 Particulates

Dust particles, aerosols and gaseous by-products from construction activities, and processing and preparation of materials (such as from asphaltic batch plants) must be controlled at all times, including weekends, holidays, and hours when work is not in progress. Maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates that would exceed 40 CFR 50, state, and local air pollution standards or that would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, baghouse, scrubbers, electrostatic precipitators, or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp. Provide sufficient, competent equipment available to accomplish these tasks. Perform particulate control as the work proceeds and whenever a particulate nuisance or hazard occurs. Comply with state and local visibility regulations.

3.5.7.2 Abrasive Blasting

Blasting operations cannot be performed without prior approval of the Installation Air Program Manager. The use of silica sand is prohibited in sandblasting.

Provide tarpaulin drop cloths and windscreens to enclose abrasive blasting operations to confine and collect dust, abrasive agent, paint chips, and other debris. Perform work involving removal of hazardous material in accordance with 29 CFR 1910.

3.5.8 Odors

Control odors from construction activities. The odors must be in compliance with state regulations and local ordinances and may not constitute a health hazard.

3.6 WASTE MINIMIZATION

Minimize the use of hazardous materials and the generation of waste. Include procedures for pollution prevention/ hazardous waste minimization in the Hazardous Waste Management Section of the EPP. Obtain a copy of the installation's Pollution Prevention/Hazardous Waste Minimization Plan for reference material when preparing this part of the EPP. If no written plan exists, obtain information by contacting the Contracting Officer. Describe the anticipated types of the hazardous materials to be used in

the construction when requesting information.

3.6.1 Salvage, Reuse and Recycle

Identify anticipated materials and waste for salvage, reuse, and recycling. Describe actions to promote material reuse, resale or recycling. To the extent practicable, all scrap metal must be sent for reuse or recycling and will not be disposed of in a landfill.

Include the name, physical address, and telephone number of the hauler, if transported by a franchised solid waste hauler. Include the destination and, unless exempted, provide a copy of the state or local permit (cover) or license for recycling.

3.6.2 Nonhazardous Solid Waste Diversion Report

Maintain an inventory of nonhazardous solid waste diversion and disposal of construction and demolition debris. Submit a report to the Contracting Officer on the first working day after each fiscal year quarter, starting the first quarter that nonhazardous solid waste has been generated. Include the following in the report:

Construction and Demolition (C&D) Debris Disposed	As appropriate
C&D Debris Recycled	As appropriate
C&D Debris Composted	As appropriate
Total C&D Debris Generated	As appropriate
Waste Sent to Waste-To-Energy Incineration Plant (This amount should not be included in the recycled amount)	As appropriate

3.7 WASTE MANAGEMENT AND DISPOSAL

3.7.1 Waste Determination Documentation

Complete a Waste Determination form (provided at the pre-construction conference) for Contractor-derived wastes to be generated. All potentially hazardous solid waste streams that are not subject to a specific exclusion or exemption from the hazardous waste regulations (e.g., scrap metal, domestic sewage) or subject to special rules, (lead-acid batteries and precious metals) must be characterized in accordance with the requirements of 40 CFR 262.11 or corresponding applicable state or local regulations. Base waste determination on user knowledge of the processes and materials used, and analytical data when necessary. Consult with the Installation environmental staff for guidance on specific requirements. Attach support documentation to the Waste Determination form. As a minimum, provide a Waste Determination form for the following waste (this listing is not exhaustive): oil- and latex -based painting and caulking products, solvents, adhesives, aerosols, petroleum products, and containers of the original materials.

3.7.1.1 Sampling and Analysis of Waste

3.7.1.1.1 Waste Sampling

Sample waste in accordance with EPA SW-846. Clearly mark each sampled drum or container with the Contractor's identification number, and cross reference to the chemical analysis performed.

Containers must be marked with the words" pending analysis" and the date of analysis until a formal waste determination has been made.

3.7.1.1.2 Laboratory Analysis

Follow the analytical procedure and methods in accordance with the 40 CFR 261. Provide analytical results and reports performed to the Contracting Officer. Coordinate all activities with Installation Hazardous Waste Program Manager. The Installation Waste Program Manager shall make the final determination on all waste.

3.7.1.1.3 Analysis Type

Identify hazardous waste by analyzing for the following characteristics: ignitability, corrosivity, reactivity, toxicity based on TCLP (Metals, VOCs, SVOCs, Pesticides and Herbicides) results, TPH (GRO and DRO), PCBs, BTEX, TOX, PFAS, and paint filter. Approval of generator knowledge (including documentation) must be coordinated and reviewed by the Installation Hazardous Waste program Manager as part of the waste determination prior to approval by the Contracting Officer..

3.7.2 Solid Waste Management

3.7.2.1 Project Solid Waste Disposal Documentation Report

Provide copies of the waste handling facilities' weight tickets, receipts, bills of sale, and other sales documentation. In lieu of sales documentation, a statement indicating the disposal location for the solid waste that is signed by an employee authorized to legally obligate or bind the firm may be submitted. The sales documentation Contractor certification must 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 for the Contractor's own use, submit the information previously described in this paragraph on the solid waste disposal report. Prices paid or received do not have to be reported to the Contracting Officer unless required by other provisions or specifications of this Contract or public law.

3.7.2.2 Control and Management of Solid Wastes

Pick up solid wastes, and place in covered containers that 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. Employ segregation measures so that no hazardous or toxic waste will become co-mingled with non-hazardous solid waste. Transport solid waste off Government property and dispose of it in compliance with 40 CFR 260, state, and local requirements for solid waste disposal. A Subtitle D RCRA permitted landfill is the minimum acceptable offsite solid waste disposal option. Verify that the selected transporters and disposal facilities have the

necessary permits and licenses to operate. Haul waste materials to the Government landfill site designated by the Contracting Officer. Comply with site procedures. Segregate and separate treated wood components disposed at a lined landfill approved to accept this waste in accordance with local and state regulations. Solid waste disposal offsite must comply with most stringent local, state, and federal requirements, including 40 CFR 241, 40 CFR 243, and 40 CFR 258.

Manage hazardous material used in construction, including but not limited to, aerosol cans, waste paint, cleaning solvents, contaminated brushes, and used rags, in accordance with 49 CFR 173.

3.7.3 Control and Management of Hazardous Waste

Do not dispose of hazardous waste on Government property. Do not discharge any waste to a sanitary sewer, storm drain, or to surface waters or conduct waste treatment or disposal on Government property without written approval of the Contracting Officer and Installation Hazardous Waste Manager.

3.7.3.1 Hazardous Waste/Debris Management

Identify construction activities that will generate hazardous waste or debris. Provide a documented waste determination for resultant waste streams. Identify, label, handle, store, and dispose of hazardous waste or debris in accordance with 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.

Manage hazardous waste in accordance with the approved Hazardous Waste Management Section of the EPP. 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 is identified as being generated by the Government. Prior to removal of any hazardous waste from Government property, hazardous waste manifests must be signed by personnel from the Installation Environmental Office. Do not bring hazardous waste onto Government property. Provide the Contracting Officer with 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.

3.7.3.2 Waste Storage/Satellite Accumulation/90 Day Storage Areas

Accumulate hazardous waste at satellite accumulation points and in compliance with the Installation Waste Manager, 40 CFR 262 and applicable state or local regulations. Individual waste streams will be limited to 55 gallons of accumulation (or one quart for acutely hazardous wastes). If the Contractor expects to generate hazardous waste at a rate and quantity that makes satellite accumulation impractical, the Contractor may request a temporary 90-day or 180-day, as appropriate, accumulation point be established. Submit a request in writing to the Contracting Officer and provide the following information (Attach Site Plan to the Request):

Contract Number	
Contractor	
Haz/Waste or Regulated Waste POC	

Contract Number	
Phone Number	
Type of Waste	
Source of Waste	
Emergency POC	
Phone Number	
Location of the Site	

Attach a Waste Determination form for the expected waste streams. Allow 10 working days for processing this request. Additional compliance requirements (e.g., training and contingency planning) that may be required are the responsibility of the Contractor. Barricade the designated area where waste is being stored and post a sign identifying as follows:

"DANGER - UNAUTHORIZED PERSONNEL KEEP OUT"

3.7.3.3 Hazardous Waste Disposal

3.7.3.3.1 Responsibilities for Contractor's Disposal

Provide hazardous waste manifest to the Installations Environmental Office for review, approval, and signature prior to shipping waste off Government property.

3.7.3.3.1.1 Services

Provide service necessary for the final treatment or disposal of the hazardous material or waste in accordance with 40 CFR 260 - 40 CFR 279, local, and state, laws and regulations, and the terms and conditions of the Contract within 60 days after the materials have been generated. These services include necessary personnel, labor, transportation, packaging, detailed analysis (if required for disposal or transportation, include manifesting or complete waste profile sheets, equipment, and compile documentation).

3.7.3.3.1.2 Samples

Obtain a representative sample of the material generated for each job done to provide waste stream determination.

3.7.3.3.1.3 Analysis

Analyze each sample taken and provide analytical results to the Contracting Officer. See paragraph WASTE DETERMINATION DOCUMENTATION.

3.7.3.3.1.4 Labeling

During waste accumulation label all containers in accordance with 40 CFR 262. Prior to offering a waste for off-site transport, determine the Department of Transportation's (DOT's) proper shipping names for waste in accordance with 49 CFR 172 (each container requiring disposal) and demonstrate to the Contracting Officer how this determination is developed

and supported by the sampling and analysis requirements contained herein. Label all containers of hazardous waste with the words "Hazardous Waste" or other words to describe the contents of the container in accordance with 40 CFR 262 and applicable state or local regulations.

3.7.3.3.2 Contractor Disposal Turn-In Requirements

Hazardous waste generated must be disposed of in accordance with the following conditions to meet installation requirements:

a. Drums must be compatible with waste contents and drums must meet DOT requirements for 49 CFR 173 for transportation of materials.

b. Band drums to wooden pallets.

c. No more than three 55 gallon drums or two 85 gallon over packs are to be banded to a pallet.

d. Band using 1-1/4 inch minimum band on upper third of drum.

e. Provide label in accordance with 49 CFR 172.101.

f. Leave 3 to 5 inches of empty space above volume of material.

3.7.3.4 Universal Waste Management

Manage the following categories of universal waste in accordance with federal, state, and local requirements and installation instructions:

a. Batteries as described in 40 CFR 273.2

b. Lamps as described in 40 CFR 273.5

c. Mercury-containing equipment as described in 40 CFR 273.4

d. Aerosol cans as described in 40 CFR 273.6

e. Installation specific

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.

3.7.3.5 Electronics End-of-Life Management

Recycle or dispose of electronics waste, including, but not limited to, used electronic devices such computers, monitors, hard-copy devices, televisions, mobile devices, in accordance with 40 CFR 260-262, state, and local requirements, and installation instructions.

3.7.3.6 Disposal Documentation for Hazardous and Regulated Waste

Contact the Contracting Officer or designated representative 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 manifests must be reviewed, signed, and approved by the Contracting Officer before the Contractor may ship waste. To obtain specific disposal instructions, coordinate with the Installation Environmental Office. Refer to location special requirements for the Installation Point of Contact information.

3.7.4 Releases/Spills of Oil and Hazardous Substances

3.7.4.1 Response and Notifications

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 in accordance with 40 CFR 300. 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 Regional Dispatch Center (RDC) immediately at 757-433-911, along with the Contracting Officer and the state or local authority.

Submit verbal and written notifications as required by NAS Oceana in accordance with the federal (40 CFR 300.125 and 40 CFR 355), state, local regulations and instructions. Provide copies of the written notification and documentation that a verbal notification was made within 20 days. Spill response must be in accordance with 40 CFR 300 and applicable Navy, Federal, state and local regulations. Contain and clean up these spills without cost to the Government.

3.7.4.2 Clean Up

Clean up hazardous and non-hazardous waste spills. Reimburse the Government for costs incurred including sample analysis materials, clothing, equipment, and labor if the Government will initiate its own spill cleanup procedures, for Contractor- responsible spills, when: Spill cleanup procedures have not begun within one hour of spill discovery/occurrence; or, in the Government's judgment, spill cleanup is inadequate and the spill remains a threat to human health or the environment.

3.7.5 Mercury Materials

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.

Do not recycle a mercury spill cleanup; manage it as a hazardous waste for disposal.

3.7.6 Wastewater

3.7.6.1 Disposal of Wastewater

Disposal of wastewater must be as specified below.

3.7.6.1.1 Treatment

Do not allow wastewater from construction activities, such as onsite material processing, concrete curing, foundation and concrete clean-up, water used in concrete trucks, and forms to enter water ways or to be discharged. Dispose of the construction- related waste water off-Government property in accordance with 40 CFR 403, state, regional, and local laws and Prior to disposal, submit a WIS to the Installation Environmental Officeand have the results reviewed and approved by the Contracting Officer prior to being discharged or disposed of off-Government property.

3.7.6.1.2 Surface Discharge

Site generated wastewater must be tested by the contractor to determine if the wastewater can be discharged to the sanitary sewer system. The wastewater may not be discharged to the storm sewer system.

For discharge of ground water, obtain a state or federal permit specific for pumping and discharging ground water prior to surface discharging. Surface discharge in accordance with federal, state, and local laws and regulations. Surface discharge in accordance with the requirements of the NPDES or state STORMWATER DISCHARGES FROM CONSTRUCTION SITES permit.

3.7.6.1.3 Land Application

Water generated from the flushing of lines after disinfection or disinfection in conjunction with hydrostatic testing must be land- applied in accordance with federal, state, and local laws and regulations for land application.

3.8 HAZARDOUS MATERIAL MANAGEMENT

Include hazardous material control procedures in the Accident Prevention Plan (APP), in accordance with Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS. Address procedures and proper handling of hazardous materials, including the appropriate transportation requirements. Do not bring hazardous material onto Government property that does not directly relate to requirements for the performance of this contract. Submit an SDS and estimated quantities to be used for each hazardous material to the Contracting Officer prior to bringing the material on the installation. Typical materials requiring SDS and quantity reporting include, but are not limited to, oil and latex based painting and caulking products, solvents, adhesives, aerosol, and petroleum products. Use hazardous materials in a manner that minimizes the amount of hazardous waste generated. Containers of hazardous materials must have National Fire Protection Association labels or their equivalent. Certify that hazardous materials removed from the site are hazardous materials and do not meet the definition of hazardous waste, in accordance with 40 CFR 261 and state and installation requirements.

3.8.1 Contractor Hazardous Material Inventory Log

Submit the "Contractor Hazardous Material Inventory Log"(found at: https://www.wbdg.org/dod/ufgs /forms-graphics-tables), which provides information required by (EPCRA Sections 312 and 313) along with corresponding SDS, 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. Keep copies of the SDSs for hazardous materials onsite. At the end of the project, provide the Contracting Officer with copies of the SDSs, and 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.

The Contracting Officer may request documentation for any spills or releases, environmental reports, or off-site transfers.

3.9 PREVIOUSLY USED EQUIPMENT

Clean previously used construction equipment prior to bringing it onto the project site. Equipment must be free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds. Consult with the U.S. Department of Agriculture jurisdictional office for additional cleaning requirements.

3.10 CONTROL AND MANAGEMENT OF ASBESTOS-CONTAINING MATERIAL (ACM)

Manage and dispose of asbestos- containing waste in accordance with all applicable federal, state, and local (or Host Nation) requirements. Refer to Section 02 82 00 ASBESTOS REMEDIATION. Manifest asbestos-containing waste and provide the manifest to the Contracting Officer. Notifications to the regulatory authorities and Installation Air Program Manager are required before starting any asbestos work.

3.11 CONTROL AND MANAGEMENT OF LEAD-BASED PAINT (LBP)

Manage and dispose of lead-contaminated waste in accordance with 40 CFR 745 and Section 02 83 00 LEAD REMEDIATION. Manifest any lead-contaminated waste and provide the manifest to the Contracting Officer.

3.12 CONTROL AND MANAGEMENT OF POLYCHLORINATED BIPHENYLS (PCBs)

Manage and dispose of PCB-contaminated waste in accordance with 40 CFR 761 and Section 02 84 33 REMOVAL AND DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs).

3.13 CONTROL AND MANAGEMENT OF LIGHTING BALLAST AND LAMPS CONTAINING PCBs

Manage and dispose of contaminated waste in accordance with 40 CFR 761. Refer to Section 02 84 16 HANDLING OF LIGHTING BALLASTS AND LAMPS CONTAINING PCBs AND MERCURY.

3.14 PETROLEUM, OIL, LUBRICANT (POL) STORAGE AND FUELING

POL products include flammable or combustible liquids, such as gasoline, diesel, lubricating oil, used engine oil, hydraulic oil, mineral oil, and cooking oil. Store POL products and fuel equipment and motor vehicles in a manner that affords the maximum protection against spills into the environment. Manage and store POL products in accordance with EPA 40 CFR 112, and other federal, state, regional, and local laws and regulations. Use secondary containments, dikes, curbs, and other barriers, to prevent POL products from spilling and entering the ground, storm or sewer drains, stormwater ditches or canals, or navigable waters of the United States. Describe in the EPP (see paragraph ENVIRONMENTAL PROTECTION PLAN) how POL tanks and containers must be stored, managed, and inspected and what protections must be provided. Storage of fuel on the

project site must be in accordance with EPA, state, and local laws and regulations and paragraph OIL STORAGE INCLUDING FUEL TANKS.

3.14.1 Used Oil Management

Manage used oil generated on site in accordance with 40 CFR 279. Determine if any used oil generated while onsite exhibits a characteristic of hazardous waste. Used oil containing 1,000 parts per million of solvents is considered a hazardous waste and disposed of at the Contractor's expense. Used oil mixed with a hazardous waste is also considered a hazardous waste. Dispose in accordance with paragraph HAZARDOUS WASTE DISPOSAL.

3.14.2 Oil Storage Including Fuel Tanks

Provide secondary containment and overfill protection for oil storage tanks. A berm used to provide secondary containment must be of sufficient size and strength to contain the contents of the tanks plus 5 inches freeboard for precipitation. Construct the berm to be impervious to oil for 72 hours that no discharge will permeate, drain, infiltrate, or otherwise escape before cleanup occurs. Use drip pans during oil transfer operations; adequate absorbent material must be onsite to clean up any spills and prevent releases to the environment. Cover tanks and drip pans during inclement weather. Provide procedures and equipment to prevent overfilling of tanks. If tanks and containers with an aggregate aboveground capacity greater than 1320 gallons will be used onsite (only containers with a capacity of 55 gallons or greater are counted), provide and implement a Spill Prevention Control and Countermeasure (SPCC) plan meeting the requirements of 40 CFR 112. Do not bring underground storage tanks to the installation for Contractor use during a project. Submit the SPCC plan to the Contracting Officer for approval.

Monitor and remove any rainwater that accumulates in open containment dikes or berms. Inspect the accumulated rainwater prior to draining from a containment dike to the environment, to determine there is no oil sheen present.

3.15 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, immediately notify the Regional Dispatch Center at 757-433-911, and the Contracting Officer. Do not disturb this material until authorized by the Contracting Officer.

3.16 PEST MANAGEMENT

In order to minimize impacts to existing fauna and flora, coordinate with the Installation Pest Management Coordinator (IPMC) through the Contracting Officer, at the earliest possible time prior to pesticide application. Discuss integrated pest management strategies including prevention of invasive species as applicable with the IPMC and receive concurrence from the IPMC through the Contracting Officer prior to the application of any pesticide associated with these specifications. Provide Installation Project Office Pest Management personnel the opportunity to be present at meetings concerning treatment measures for pest or disease control and during application of the pesticide. The use and management of pesticides are regulated under 40 CFR 152 - 186.

3.16.1 Application

Apply pesticides using a state-certified pesticide applicator in accordance with EPA label restrictions and recommendation. The certified applicator must wear clothing and personal protective equipment as specified on the pesticide label. The Contracting Officer will designate locations for water used in formulating. Do not allow the equipment to overflow. Inspect equipment for leaks, clogging, wear, or damage and repair prior to application of pesticide.

3.16.2 Pesticide Treatment Plan

Include and update a pesticide treatment plan, as information becomes available. Include in the plan the sequence of treatment, dates, times, locations, pesticide trade name, EPA registration numbers, authorized uses, chemical composition, formulation, original and applied concentration, application rates of active ingredient (that is, pounds of active ingredient applied), equipment used for application and calibration of equipment. Comply with 40 CFR 152-189, state, regional, and local pest management record-keeping and reporting requirements as well as any additional Installation Project Office specific requirements in conformance with DA AR 200-1 Chapter 5, Pest Management, Section 5-4 "Program requirements" for data required to be reported to the Installation.

3.17 CHLORDANE

Evaluate excess soils and concrete foundation debris generated during the demolition of housing units or other wooden structures for the presence of chlordane or other pesticides prior to reuse or final disposal.

3.18 SOUND INTRUSION

Make the maximum use of low-noise emission products, as certified by the EPA. Blasting or use of explosives are not 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.

Keep construction activities under surveillance and control to minimize environment damage by noise. Comply with the provisions of the State of Virginia rules.

3.19 LIGHT INTRUSION

If the activity proposes to conduct night operations or install lighting in association with this project, the activity should NOT install lighting that could disorient birds migrating and sea turtle nesting/hatching at night. Activity should shield lights to direct the light downwards and reduce ambient light. Activity should follow Unified Facilities Criteria (UFC), Interior and exterior lighting systems and controls and ensure: Lighting structures be installed that minimize ambient light (light should be directed/shielded downwards, not up or out), the following website provides examples of acceptable and unacceptable lighting fixtures http://darksky.org/lighting/lighting-basics/; and light-bulbs to be installed should utilize a color temperature of no more than 3000 Kelvins (NO blue-rich white lights), utilizing “warm-white” or filtered LEDs can

meet this requirement. This may mean more poles have to be installed than what would be required for higher kelvin bulbs to meet any lighting requirements.

3.20 POST CONSTRUCTION CLEANUP

Clean up areas used for construction in accordance with Contract Clause: "Cleaning Up". Unless otherwise instructed in writing by the Contracting Officer, remove traces of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. Grade parking area and similar temporarily used areas to conform with surrounding contours.

3.21 SOUTHEAST

3.21.1 Virginia

3.21.1.1 Waste Storage/Satellite Accumulation

For Hazardous Waste accumulation areas, submit weekly hazardous waste inspection logs to the Station Hazardous Waste Manager via the Contracting Officer and maintain compliance with 40 CFR 265.16 personnel training requirements. Ensure containers are kept closed (except when adding or removing waste) and that containers remain in good condition and are properly labeled. Store Regulated waste for up to 190 day.

-- End of Section --

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
02/19, CHG 3: 11/21

PART 1 GENERAL

1.1 DEFINITIONS

1.1.1 Co-mingle

The practice of placing unrelated materials together in a single container, usually for benefits of convenience and speed.

1.1.2 Construction Waste

Waste generated by construction activities, such as scrap materials, damaged or spoiled materials, temporary and expendable construction materials, and other waste generated by the workforce during construction activities.

1.1.3 Demolition Debris/Waste

Waste generated from demolition activities, including minor incidental demolition waste materials generated as a result of Intentional dismantling of all or portions of a building, to include clearing of building contents that have been destroyed or damaged.

1.1.4 Disposal

Depositing waste in a solid waste disposal facility, usually a managed landfill or incinerator, regulated in the US under the Resource Conservation and Recovery Act (RCRA).

1.1.5 Diversion

The practice of diverting waste from disposal in a landfill or incinerator, by means of eliminating or minimizing waste, or reuse of materials.

1.1.6 Final Construction Waste Diversion Report

A written assertion by a material recovery facility operator identifying constituent materials diverted from disposal, usually including summary tabulations of materials, weight in short-ton.

1.1.7 Recycling

The series of activities, including collection, separation, and processing, by which products or other materials are diverted from the solid waste stream for use in the form of raw materials in the manufacture of new products sold or distributed in commerce, or the reuse of such materials as substitutes for goods made of virgin materials, other than fuel.

1.1.8 Reuse

The use of a product or materials again for the same purpose, in its

original form or with little enhancement or change.

1.1.9 Salvage

Usable, salable items derived from buildings undergoing demolition or deconstruction, parts from vehicles, machinery, other equipment, or other components.

1.1.10 Source Separation

The practice of administering and implementing a management strategy to identify and segregate unrelated waste at the first opportunity.

1.2 CONSTRUCTION WASTE (INCLUDES DEMOLITION DEBRIS/WASTE)

Divert a minimum of 60 percent by weight of the project construction waste and demolition debris/waste from the landfill or incinerator. Follow applicable industry standards in the management of waste. Apply sound environmental principles in the management of waste. (1) Practice efficient waste management when sizing, cutting, and installing products and materials and (2) use all reasonable means to divert construction waste and demolition debris/waste from landfills and incinerators and to facilitate the recycling or reuse of excess construction materials.

1.3 CONSTRUCTION WASTE MANAGEMENT

Implement a Construction Waste Management Program for the project. Take a pro-active, responsible role in the management of construction waste, recycling process, disposal of demolition debris/waste, and require all subcontractors, vendors, and suppliers to participate in the Construction Waste Management Program. Establish a process for clear tracking, and documentation of construction waste and demolition debris/waste.

1.3.1 Implementation of Construction Waste Management Program

Develop and document how the Construction Waste Management Program will be implemented in a Construction Waste Management Plan. Submit a Construction Waste Management Plan to the Contracting Officer for approval. Construction waste and demolition debris/waste materials include un-used construction materials not incorporated in the final work, as well as demolition debris/waste materials from demolition activities or deconstruction activities. In the management of waste, consider the availability of viable markets, the condition of materials, the ability to provide material in suitable condition and in a quantity acceptable to available markets, and time constraints imposed by internal project completion mandates.

1.3.2 Oversight

The Environmental Manager, as specified in Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS, is responsible for overseeing and documenting results from executing the Construction Waste Management Plan for the project.

1.3.3 Special Programs

Implement special programs involving rebates or similar incentives related to recycling of construction waste and demolition debris/waste materials. Retain revenue or savings from salvaged or recycling, unless otherwise

directed. Ensure firms and facilities used for recycling, reuse, and disposal are permitted for the intended use to the extent required by federal, state, and local regulations.

1.3.4 Special Instructions

Provide on-site instruction of appropriate separation, handling, recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the projects. Designation of single source separating or commingling will be clearly marked on the containers.

1.3.5 Waste Streams

Delineate waste streams and characterization, including estimated material types and quantities of waste, in the Construction Waste Management Plan. Manage all waste streams associated with the project. Typical waste streams are listed below. Include additional waste steams not listed:

a. Land Clearing Debris

b. Asphalt

c. Masonry and CMU

d. Concrete

e. Metals (Includes, but is not limited to, banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized, stainless steel, aluminum, copper, zinc, bronze.)

f. Wood (nails and staples allowed)

g. Glass

h. Paper

i. Plastics (PET, HDPE,PVC,LDPE,PP,PS, Other)

j. Gypsum

k. Non-hazardous paint and paint cans

l. Carpet

m. Ceiling Tiles

n. Insulation

o. Beverage Containers

1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Construction Waste Management Plan; G

SD-11 Closeout Submittals

Final Construction Waste Diversion Report; S

1.5 MEETINGS

Conduct Construction Waste Management meetings. After award of the Contract and prior to commencement of work, schedule and conduct a meeting with the Contracting Officer to discuss the proposed Construction Waste Management Plan and to develop a mutual understanding relative to the management of the Construction Waste Management Program and how waste diversion requirements will be met.

The requirements of this meeting may be fulfilled during the coordination and mutual Understanding meeting outlined in Section 01 45 00 QUALITY CONTROL. At a minimum, discuss and document waste management goals at following meetings:

a. Preconstruction meeting.

b. Regular Quality Control meetings.

c. Work safety meeting (if applicable).

1.6 CONSTRUCTION WASTE MANAGEMENT PLAN

Submit Construction Waste Management Plan within 45 days after notice to proceed. Revise and resubmit Construction Waste Management Plan as necessary, in order for construction to begin. Execute demolition or deconstruction activities in accordance with Section 02 41 00 DEMOLITION. Manage demolition debris/waste or deconstruction materials in accordance with the approved construction waste management plan.

An approved Construction Waste Management Plan will not relieve the Contractor of responsibility for compliance with applicable environmental regulations or meeting project cumulative waste diversion requirement. Ensure all subcontractors receive a copy of the approved Construction Waste Management Plan. The plan demonstrates how to meet the project waste diversion requirement. Also, include the following in the plan:

a. Identify the names of individuals responsible for waste management and waste management tracking, along with roles and responsibilities on the project.

b. Actions that will be taken to reduce solid waste generation, including coordination with subcontractors to ensure awareness and participation.

c. Description of the regular meetings to be held to address waste management.

d. Description of the specific approaches to be used in recycling/reuse of the various materials generated, including the areas on site and equipment to be used for processing, sorting, and temporary storage of materials.

e. Name of landfill and incinerator to be used.

f. Identification of local and regional re-use programs, including non-profit organizations such as schools, local housing agencies, and organization that accept used materials such as material exchange networks and resale stores. Include the name, location, phone number for each re-use facility identified, and provide a copy of the permit or license for each facility.

g. List of specific materials, by type and quantity, that will be salvaged for resale, salvaged and reused on the current project, salvaged and stored for reuse on a future project, or recycled. Identify the recycling facilities by name, address, and phone number.

h. Identification of materials that cannot be recycled or reused with an explanation or justification, to be approved by the Contracting Officer.

i. Description of the means by which materials identified in item (g) above will be protected from contamination.

j. Description of the means of transportation of the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site).

k. Copy of training plan for subcontractors and other services to prevent contamination by co-mingling materials identified for diversion and waste materials.

1.7 RECORDS (DOCUMENTATION)

1.7.1 General

Maintain records to document the types and quantities of waste generated and diverted though re-use, recycling and sale to third parties; through disposal to a landfill or incinerator facility. Provide explanations for materials not recycled, reused or sold. Collect and retain manifests, weight tickets, sales receipts, and invoices specifically identifying diverted project waste materials or disposed materials.

1.7.2 Accumulated

Maintain a running record of materials generated and diverted from landfill disposal, including accumulated diversion rates for the project. Make records available to the Contracting Officer during construction or incidental demolition activities. Provide a copy of the diversion records to the Contracting Officer upon completion of the construction, incidental demolitions or minor deconstruction activities.

1.8 FINAL CONSTRUCTION WASTE DIVERSION REPORT

A Final Construction Waste Diversion Report is required at the end of the project. Provide Final Construction Waste Diversion Report 60 days prior to the Beneficial Occupancy Date (BOD). The final Construction Waste Diversion Report must be included in the Sustainability eNotebook in accordance with Section 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING.

1.9 COLLECTION

Collect, store, protect, and handle reusable and recyclable materials at the site in a manner which prevents contamination, and provides protection from the elements to preserve their usefulness and monetary value. Provide receptacles and storage areas designated specifically for recyclable and reusable materials and label them clearly and appropriately to prevent contamination from other waste materials. Keep receptacles or storage areas neat and clean.

Train subcontractors and other service providers to either separate waste streams or use the co-mingling method as described in the Construction Waste Management Plan. Handle hazardous waste and hazardous materials in accordance with applicable regulations and coordinate with Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS and Section 02 81 00 TRANSPORTATION AND DISPOSAL OF HAZARDOUS MATERIALS. Separate materials by one of the following methods:

1.9.1 Source Separation Method

Separate waste products and materials that are recyclable from trash and sort as described below into appropriately marked separate containers and then transport to the respective recycling facility for further processing. Deliver materials in accordance with recycling or reuse facility requirements (e.g., free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process). Separate materials into the category types as defined in the Construction Waste Management Plan.

1.9.2 Other Methods

Other methods proposed by the Contractor may be used when approved by the Contracting Officer.

1.10 DISPOSAL

Control accumulation of waste materials and trash. Recycle or dispose of collected materials off-site at intervals approved by the Contracting Officer and in compliance with waste management procedures as described in the waste management plan. Except as otherwise specified in other sections of the specifications, dispose of in accordance with the following:

1.10.1 Reuse

Give first consideration to reusing construction and demolition materials as a disposition strategy. Recover for reuse materials, products, and components as described in the approved Construction Waste Management Plan. Coordinate with the Contracting Officer to identify onsite reuse opportunities or material sales or donation available through Government resale or donation programs. Sale of recovered materials is not allowed on the Installation. Consider the use of surplus industrial supply broker services, who match entities with reusable or repurpose industrial materials with entities with need of such materials.

1.10.2 Recycle

Recycle non-hazardous construction and demolition/debris materials that are not suitable for reuse. Track rejection of contaminated recyclable

materials by the recycling facility. Rejected recyclables materials will not be counted as a percentage of diversion calculation. Recycle all fluorescent lamps, HID lamps, mercury (Hg) -containing thermostats and ampoules, and PCBs-containing ballasts and electrical components as directed by the Contracting Officer. Do not crush lamps on site as this creates a hazardous waste stream with additional handling requirements.

1.10.3 Waste

Dispose by landfill or incineration only those waste materials with no practical use, economic benefit, or recycling opportunity.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used. -- End of Section --

SECTION 01 78 00

CLOSEOUT SUBMITTALS
05/19, CHG 1: 08/21

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 E1971	(2024) Standard Guide for Stewardship for the Cleaning of Commercial and Institutional Buildings

GREEN SEAL (GS)

GS-37	(2017) Cleaning Products for Industrial and Institutional Use

U.S. DEPARTMENT OF DEFENSE (DOD)

FC 1-300-09N	(2024) Navy and Marine Corps Design
UFC 1-300-08	(2023) Criteria for Transfer and Acceptance of DoD Real Property

1.2 DEFINITIONS

1.2.1 As-Built Drawings

As-built drawings are the marked-up drawings, maintained by the Contractor on-site, that depict actual conditions and deviations from the Contract Documents. These deviations and additions may result from coordination required by, but not limited to: contract modifications; official responses to submitted Requests for Information (RFI's); direction from the Contracting Officer; design that is the responsibility of the Contractor, and differing site conditions. Maintain the as-builts throughout construction as red-lined hard copies on site. These files serve as the basis for the creation of the record drawings.

1.2.2 Record Drawings

The record drawings are the final compilation of actual conditions reflected in the as-built drawings.

1.3 SOURCE DRAWING FILES

Request the full set of electronic drawings, in the source format, for Record Drawing preparation, after award and at least 30 days prior to required use.

1.3.1 Terms and Conditions

Data contained on these electronic files must not be used for any purpose other than as a convenience in the preparation of construction drawings and data for the referenced project. Any other use or reuse is at the sole risk of the Contractor and without liability or legal exposure to the Government. The Contractor must make no claim and waives to the fullest extent permitted by law, any claim or cause of action of any nature against the Government, its agents or sub consultants that may arise out of or in connection with the use of these electronic files. The Contractor must, to the fullest extent permitted by law, indemnify and hold the Government harmless against all damages, liabilities or costs, including reasonable attorney's fees and defense costs, arising out of or resulting from the use of these electronic files.

These electronic CAD drawing files are not construction documents. Differences may exist between the CAD files and the corresponding construction documents. The Government makes no representation regarding the accuracy or completeness of the electronic CAD files, nor does it make representation to the compatibility of these files with the Contractor hardware or software. In the event that a conflict arises between the signed and sealed construction documents prepared by the Government and the furnished Source drawing files, the signed and sealed construction documents govern. The Contractor is responsible for determining if any conflict exists. Use of these Source Drawing files does not relieve the Contractor of duty to fully comply with the contract documents, including and without limitation, the need to check, confirm and coordinate the work of all contractors for the project. If the Contractor uses, duplicates or modifies these electronic source drawing files for use in producing construction drawings and data related to this contract, remove all previous indicia of ownership (seals, logos, signatures, initials and dates).

1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-03 Product Data

Warranty Management Plan

Warranty Tags

Final Cleaning

Spare Parts Data

SD-08 Manufacturer's Instructions

Posted Instructions

SD-11 Closeout Submittals

As-Built Drawings; G

Record Drawings; G

Warranted Equipment and Materials

Certification of EPA Designated Items; G

Certification Of USDA Designated Items; G

Interim DD FORM 1354; G

High Performance and Sustainable Building (HPSB) Checklist; G

List Of Installed Building Equipment Items For DD Form 1354

1.5 SPARE PARTS DATA

Submit two copies of the Spare Parts Data list.

a. Indicate manufacturer's name, part number, and stock level required for test and balance, pre-commissioning, maintenance and repair activities. List those items that may be standard to the normal maintenance of the system.

1.6 WARRANTY MANAGEMENT

1.6.1 Warranty Management Plan

Develop a warranty management plan which contains information relevant to FAR 52.246-21 Warranty of Construction. At least 30 days before the planned pre-warranty conference, submit one set of the warranty management plan. Include within the warranty management plan all required actions and documents to assure that the Government receives all warranties to which it is entitled. The plan narrative must contain sufficient detail to render it suitable for use by future maintenance and repair personnel, whether tradesmen, or of engineering background, not necessarily familiar with this contract. The term "status" as indicated below must include due date and whether item has been submitted or was accomplished. Submit warranty information, made available during the construction phase, to the Contracting Officer for approval prior to each monthly pay estimate. Assemble approved information in a binder and turn over to the Government upon acceptance of the work. The construction warranty period must begin on the date of project acceptance and continue for the full product warranty period. Conduct a joint 4 month and 9 month warranty inspection, measured from time of acceptance; with the Contractor, Contracting Officer and the Customer Representative. The warranty management plan must include, but is not limited to, the following:

a. Roles and responsibilities of personnel associated with the warranty process, including points of contact and telephone numbers within the organizations of the Contractors, subcontractors, manufacturers or suppliers involved.

b. For each warranty, the name, address, telephone number, and e-mail of each of the guarantor's representatives nearest to the project location.

c. A list and status of delivery of Certificates of Warranty for extended warranty items, including roofs, HVAC balancing, pumps, motors, transformers, and for commissioned systems, such as fire protection and alarm systems, sprinkler systems, and lightning protection systems.

d. Warranted Equipment and Materials list for each warranted equipment, item, feature of construction or system indicating:

(1) Name of item.
(2) Model and serial numbers.
(3) Location where installed.
(4) Name and phone numbers of manufacturers or suppliers.
(5) Names, addresses and telephone numbers of sources of spare parts.
(6) Warranties and terms of warranty. Include one-year overall warranty of construction, including the starting date of warranty of construction. Items which have warranties longer than one year must be indicated with separate warranty expiration dates.
(7) Cross-reference to warranty certificates as applicable.
(8) Starting point and duration of warranty period.
(9) Summary of maintenance procedures required to continue the warranty in force.
(10) Cross-reference to specific pertinent Operation and Maintenance manuals.
(11) Organization, names and phone numbers of persons to call for warranty service.
(12) Typical response time and repair time expected for various warranted equipment.

e. The plans for attendance at the 4 and 9 month post-construction warranty inspections conducted by the Government.

f. Procedure and status of tagging of equipment covered by warranties longer than one year.

g. Copies of instructions to be posted near selected pieces of equipment where operation is critical for warranty or safety reasons.

1.6.2 Performance Bond

The Performance Bond must remain effective throughout the construction and warranty period.

a. In the event the Contractor fails to commence and diligently pursue any construction warranty work required, the Contracting Officer will have the work performed by others, and after completion of the work, will charge the remaining construction warranty funds of expenses incurred by the Government while performing the work, including, but not limited to administrative expenses.

b. In the event sufficient funds are not available to cover the construction warranty work performed by the Government at the Contractor's expense, the Contracting Officer will have the right to recoup expenses from the bonding company.

c. Following oral or written notification of required construction warranty repair work, respond in a timely manner. Written verification will follow oral instructions. Failure to respond will be cause for the Contracting Officer to proceed against the Contractor.

1.6.3 Pre-Warranty Conference

Prior to contract completion, and at a time designated by the Contracting Officer, meet with the Contracting Officer to develop a mutual

understanding with respect to the requirements of this section. At this meeting, establish and review communication procedures for Contractor notification of construction warranty defects, priorities with respect to the type of defect, reasonable time required for Contractor response, and other details deemed necessary by the Contracting Officer for the execution of the construction warranty In connection with these requirements and at the time of the Contractor's quality control completion inspection, furnish the name, telephone number and address of a licensed and bonded company which is authorized to initiate and pursue construction warranty work action on behalf of the Contractor. This point of contact must be located within the local service area of the warranted construction, be continuously available, and be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any of its responsibilities in connection with other portions of this provision.

1.6.4 Warranty Tags

At the time of installation, tag each warranted item with a durable, oil and water resistant tag approved by the Contracting Officer. Attach each tag with a copper wire and spray with a silicone waterproof coating. Also, submit two record copies of the warranty tags showing the layout and design. The date of acceptance and the QC signature must remain blank until the project is accepted for beneficial occupancy. Show the following information on the tag.

Type of product/material	
Model number	
Serial number	
Contract number	
Warranty period from/to	
Inspector's signature	
Construction Contractor	
Address	
Telephone number	
Warranty contact	
Address	
Telephone number	
Warranty response time priority code	

WARNING - PROJECT PERSONNEL TO PERFORM ONLY OPERATIONAL MAINTENANCE DURING THE WARRANTY PERIOD.

PART 2 PRODUCTS

2.1 CERTIFICATION OF EPA DESIGNATED ITEMS

Submit the Certification of EPA Designated Items as required by FAR 52.223-9 Estimate of Percentage of Recovered Material Content for EPA Designated Items and FAR 52-223-17 Affirmative Procurement of EPA designated items in Service and Construction Contracts. Include on the certification form the following information: project name, project number, Contractor name, license number, Contractor address, and certification. The certification will read as follows and be signed and dated by the Contractor. "I hereby certify the information provided herein is accurate and that the requisition/procurement of all materials listed on this form comply with current EPA standards for recycled/recovered materials content. The following exemptions may apply to the non-procurement of recycled/recovered content materials:

a. The product does not meet appropriate performance standards;

b. The product is not available within a reasonable time frame;

c. The product is not available competitively (from two or more sources);

d. The product is only available at an unreasonable price (compared with a comparable non-recycled content product)."

Record each product used in the project that has a requirement or option of containing recycled content in accordance with SECTION 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING, noting total price, total value of post-industrial recycled content, total value of post-consumer recycled content, exemptions (a, b, c, or d, as indicated), and comments. Recycled content values may be determined by weight or volume percent, but must be consistent throughout.

2.2 CERTIFICATION OF USDA DESIGNATED ITEMS

Submit the Certification of USDA Designated Items as required by FAR 52-223-1 Bio-based Product Certifications and FAR 52.223-2 Affirmative Procurement of Biobased Products Under Service and Construction Contracts. Include on the certification form the following information: project name, project number, Contractor name, license number, Contractor address, and certification. The certification will read as follows and be signed and dated by the Contractor. "I hereby certify the information provided herein is accurate and that the requisition/procurement of all materials listed on this form comply with current USDA standards for biobased materials content. The following exemptions may apply to the non-procurement of biobased content materials:

a. The product does not meet appropriate performance standards;

b. The product is not available within a reasonable time frame;

c. The product is not available competitively (from two or more sources);

d. The product is only available at an unreasonable price (compared with a comparable bio-based content product)."

Record each product used in the project that has a requirement or option of containing biobased content in accordance with SECTION 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING, noting total price, total value of post-industrial recycled content, total value of post-consumer recycled content, total value of biobased content, exemptions (a, b, c, or d, as indicated), and comments. Biobased content values may be determined by weight or volume percent, but must be consistent throughout.

PART 3 EXECUTION

3.1 AS-BUILT DRAWINGS

Provide and maintain two black line print copies of the PDF contract drawings for As-Built Drawings. Maintain the as-builts throughout construction as red-lined hard copies on site and red-lined PDF files. Submit As-Built Drawings 30 days prior to Beneficial Occupancy Date (BOD).

3.1.1 Markup Guidelines

Make comments and markup the drawings complete without reference to letters, memos, or materials that are not part of the As-Built drawing. Show what was changed, how it was changed, where item(s) were relocated and change related details. These working as-built markup prints must be neat, legible and accurate as follows:

a. Use base colors of red, green, and blue. Color code for changes as follows:

   (1) Special (Blue) - Items requiring special information, coordination, or special detailing or detailing notes.

   (2) Deletions (Red) - Over-strike deleted graphic items (lines), lettering in notes and leaders.

   (3) Additions (Green) - Added items, lettering in notes and leaders.

b. Provide a legend if colors other than the "base" colors of red, green, and blue are used.

c. Add and denote any additional equipment or material facilities, service lines, incorporated under As-Built Revisions if not already shown in legend.

d. Use frequent written explanations on markup drawings to describe changes. Do not totally rely on graphic means to convey the revision.

e. Use legible lettering and precise and clear digital values when marking prints. Clarify ambiguities concerning the nature and application of change involved.

f. Wherever a revision is made, also make changes to related section views, details, legend, profiles, plans and elevation views, schedules, notes and call out designations, and mark accordingly to avoid conflicting data on all other sheets.

g. For deletions, cross out all features, data and captions that relate to that revision.

h. For changes on small-scale drawings and in restricted areas, provide large-scale inserts, with leaders to the applicable location.

i. Indicate one of the following when attaching a print or sketch to a markup print:

(1) Add an entire drawing to contract drawings

(2) Change the contract drawing to show changes on the drawing.

(3) Provided for reference only to further detail the initial design.

j. Incorporate all shop and fabrication drawings into the markup drawings.

3.1.2 As-Built Drawings Content

Show on the as-built drawings, but not limited to, the following information:

a. The actual location, kinds and sizes of all sub-surface utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, show by offset dimensions to two permanently fixed surface features the end of each run including each change in direction on the record drawings. Locate valves, splice boxes and similar appurtenances by dimensioning along the utility run from a reference point. Also record the average depth below the surface of each run.

b. The location and dimensions of any changes within the building structure.

c. Layout and schematic drawings of electrical circuits and piping.

d. Correct grade, elevations, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from contract plans.

e. Changes in details of design or additional information obtained from working drawings specified to be prepared or furnished by the Contractor; including but not limited to shop drawings, fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment, and foundations.

f. The topography, invert elevations and grades of drainage installed or affected as part of the project construction.

g. Changes or Revisions which result from the final inspection.

h. Where contract drawings or specifications present options, show only the option selected for construction on the working as-built markup drawings.

i. If borrow material for this project is from sources on Government property, or if Government property is used as a spoil area, furnish a contour map of the final borrow pit/spoil area elevations.

j. Systems designed or enhanced by the Contractor, such as HVAC controls, fire alarm, fire sprinkler, and irrigation systems.

k. Changes in location of equipment and architectural features.

l. Modifications and compliance with FC 1-300-09N procedures.

m. Actual location of anchors, construction and control joints, etc., in concrete.

n. Unusual or uncharted obstructions that are encountered in the contract work area during construction.

o. Location, extent, thickness, and size of stone protection particularly where it will be normally submerged by water.

3.2 RECORD DRAWINGS

Prepare and provide Record Drawings and Source Documents in accordance with FC 1-300-09N. Provide four copies of Record Drawings and Documents on separate CDs or DVDs 30 days after BOD.

3.3 CLEANUP

Provide final cleaning in accordance with ASTM E1971 and submit two copies of the listing of completed final clean-up items. Leave premises "broom clean." Comply with GS-37 for general purpose cleaning and bathroom cleaning. Use only nonhazardous cleaning materials, including natural cleaning materials, in the final cleanup. 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 and comply with the Indoor Air Quality (IAQ) Management Plan. 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. Recycle, salvage, and return construction and demolition waste from project in accordance with Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS, and 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

3.4 REAL PROPERTY RECORD

Refer to UFC 1-300-08 for instruction on completing the DD FORM 1354. Contact the Contracting Officer for any project specific information necessary to complete the DD FORM 1354.

3.4.1 Interim DD FORM 1354

Near the completion of Project, but a minimum of 60 days prior to final acceptance of the work, complete and submit an accounting of all installed property with Interim DD FORM 1354. Include any additional assets, improvements, and alterations from the Draft DD FORM 1354.

3.4.2 Completed DD FORM 1354

Attach the Real Property receiving Component's completed High Performance and Sustainable Building (HPSB) Checklist for each applicable building to

the completed DD 1354, in accordance with Section 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING. For convenience, a blank fillable PDF DD FORM 1354 may be obtained at the following link: www.esd.whs.mil/Portals/54/Documents/DD/forms/dd/dd1354.pdf

Submit the completed List of Installed Building Equipment items for DD FORM 1354. Attach this list to the updated DD FORM 1354.

-- End of Section --

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA
05/23, CHG 1: 05/25

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 SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE GUIDELINE 1.4	(2019) Preparing Systems Manuals for Facilities

ASTM INTERNATIONAL (ASTM)

ASTM E1971	(2024) Standard Guide for Stewardship for the Cleaning of Commercial and Institutional Buildings
ASTM E2166	(2016; R 2023) Standard Practice for Organizing and Managing Building Data

U.S. DEPARTMENT OF DEFENSE (DOD)

FC 1-300-09N	(2024) Navy and Marine Corps Design

1.2 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-10 Operation and Maintenance Data

Facility Data Workbook; G

Training Plan; G

Training Outline; G

Training Content; G

Operation And Maintenance Manual, Progress Submittal; G

Operation And Maintenance Manual, Prefinal Submittal; G

Operation And Maintenance Manual, Final Submittal; G

SD-11 Closeout Submittals

Training Video Recording; G

Validation of Training Completion; G

Training Plan; G

Record Drawings And Utility Systems; G

1.3 MEETINGS

To assure that Operation and Maintenance Manual and Facility Data Workbook requirements are being met through the duration of the project, organize the following meetings and discuss the subsequent topics:

1.3.1 Pre-Construction Meeting

At a minimum, discuss the following:

a. The requirement for Operation and Maintenance Manuals and Facility Data deliverables under this contract including coordination meetings

b. Processes and method of gathering Facility Data information during construction

c. Primary roles and responsibilities associated with the development and delivery of the Operation and Maintenance Manuals and Facility Data deliverables, and

d. Identify and agree upon a date and attendance list for the meetings described below:

1.3.2 Operation and Maintenance Manual and Facility Data Workbook Coordination Meeting

Facilitate a meeting after the Pre-Construction Meeting prior to the submission of the Operation and Maintenance Manual Progress Submittal. Meeting attendance must include the Contractor's Operation and Maintenance Manual and Facility Data Workbook Preparer, Designer of Record (DOR), Quality Control Manager, the Commissioning Authority (CxA), the Government's Design Manager (DM), Contracting Officer's Representative, and Government's facility data reviewer. Include any Mechanical, Electrical, and Fire Protection Sub-Contractors.

The purpose of this meeting is to reach a mutual understanding of the scope of work concerning the contract requirements for Operation and Maintenance Manual and coordinate the efforts necessary by both the Government and Contractor to ensure an accurate collection, preparation and timely Government review of Operation and Maintenance Manual.

1.3.3 Submittal Coordination Meeting

Facilitate a meeting following submission and Government review of each design or progress submittal of the Operation and Maintenance Manual and Facility Data Workbook.

a. Include personnel from the Coordination meeting and any additional personnel identified.

b. The purpose of this meeting is to demonstrate ongoing compliance with

the requirements identified in this specification. Discuss Government review comments and unresolved items preventing completion and Government approval of the Operation and Maintenance Manuals and Facility Data Workbook (FDW).

c. The applicable deliverables, along with Government remarks associated with review of these submittals serve as the primary guide and agenda for this meeting.

1.3.4 Facility Turnover Meeting

Include Operation and Maintenance Manual in NAVFAC Red Zone (NRZ) facility turnover meetings as specified in Section 01 30 00, ADMINISTRATIVE REQUIREMENTS.

1.4 FACILITY DATA WORKBOOK

Develop an editable, electronic spreadsheet based on the equipment in the Operation and Maintenance Manuals that contains the information required to start a preventive maintenance program as outlined in 01 78 24.00 20 FACILITY DATA WORKBOOK (FDW). As a minimum, provide Facility Data Workbook as a list of system equipment, location installed, warranty expiration date, manufacturer, model, and serial number.

1.5 OPERATION AND MAINTENANCE MANUAL MEDIA

Assemble Operation and Maintenance Manual into an electronically bookmarked file using the most current version of Adobe Acrobat or similar software capable of producing PDF file format. Provide compact disks (CD) or data digital versatile disk (DVD) as appropriate, so that each one contains operation, maintenance and record files, project record documents, and training videos. Include a complete bookmarked operation and maintenance directory.

1.5.1 CD or DVD Label and Disk Holder or Case

Provide the following information on the disk label and disk holder or case:

a. Building Number

b. Project Title

c. Activity and Location

d. Construction Contract Number

e. Prepared For: (Contracting Agency)

f. Prepared By: (Name, title, phone number and email address)

g. Include the disk content on the disk label

h. Date

i. Virus scanning program used

1.6 O&M MANUAL CONTENT

Organize the bookmarked Operation and Maintenance Manual into the following Parts in accordance with ASHRAE GUIDELINE 1.4, and as modified and detailed below. Word template for O&M Manual is available at: www.wbdg.org/dod/ufgs/ufgs-01-78-23.

1.6.1 Part 1: Executive Summary

Provide a summary of the information found in the O&M manual including the purpose of the manual and a description of the manual's organization.

1.6.2 Part 2: Facility Design and Construction

1.6.2.1 General Facility and Systems Description

Provide an overview of the intent for design and use of the facility. Provide a PDF of the Record Drawings prepared in accordance with FC 1-300-09N and 01 78 00 CLOSEOUT SUBMITTALS and bookmarked using the sheet title and sheet number. Include uncluttered 11 by 17 inches floor plans with room numbers, type or function of space, and overall facility dimensions on the floor plans. Do not include items such as construction instructions, references, or frame numbers.

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 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.

1.6.2.2 Basis of Design

Provide a copy of the contract Basis of Design.

1.6.2.3 Contract Documents, RFP, Amendments, and Modifications

Provide the contract construction documents complete, to include specifications, drawings, Request for Proposal, amendments, and modifications.

1.6.2.4 Room Inventory of Real Property and Finishes

Provide a list of installed equipment furnished under this contract. Include all information usually listed on manufacturer's name plate. Include, as applicable, the following information for each piece of equipment installed: description of item, all dimensions, location by room number, model number, serial number, capacity, name and address of manufacturer, name and address of equipment supplier, condition, spare parts list, manufacturer's catalog, and warranty. Real property includes, but is not limited to, floor coverings, wall surfaces, ceiling surfaces, windows, roofing, HVAC filters, plumbing fixtures, and lighting fixtures. Submit the final list 30 days after transfer of the completed facility.

Include spatial data defining actual net square footage and data of each room. Also include the room finish schedule including room names and numbers. Include schedules in the construction drawings in the room inventory. Add a column to each schedule to record what was provided by the contractor during construction. Provide a PDF of room inventory. Key

the designations to the related area depicted on the contract drawings. List the following data:

RECORD OF DESIGNATED EQUIPMENT AND MATERIALS DATA				
Description	Specification Section	Manufacturer and Catalog, Model, and Serial Number	Composition and Size	Where Used

1.6.3 Part 3: Facilities, Systems, and Assemblies Information

1.6.3.1 Organization

Bookmark information in this section using the current version of ASTM E2166 Uniformat II, UFGS numbers, and document type as outlined in the example below. Bookmark/tab each item to the third level for easy navigation of the manual.

Example as shown in Table below:

PARTS AND SUBPART NUMBERING
3.1 B20 EXTERIOR CLOSURE (System)
3.1.1 B2030 EXTERIOR DOORS (Subsystem)
3.1.1.1 B2030110 GLAZED DOORS (Component)
3.1.1.1.1 Applicable specifications List in UFGS Format
3.1.1.1.2 Manufacturer's Operations and Maintenance Data
3.1.1.1.3 Approved Submittal
3.1.1.1.4 Coordination/Shop Drawings
3.1.1.1.5 Sequence of Operation for Operating Equipment
3.1.1.1.6 Testing Equipment Information and Performance Data
3.1.1.1.7 Routine Maintenance Requirements
3.1.1.1.8 Repair Procedures
3.1.1.1.9 Emergency Procedures & Locations of Applicable Controls
3.1.1.1.10 Warranties
3.1.1.1.11 Record Drawings and Utility Systems
3.1.1.1.12 Contractor / Supplies Listing and Contact Information

1.6.3.2 Related Specifications

Reference each specification related to the subsystem in this section, and locate the actual specification section in Part 2 of the O&M Manual. List specifications in table format as shown in the below example.

UFGS Number	Specification Title	Page Spec Begins in Part 2

1.6.3.3 Manufacturer's Operations and Maintenance Data

Provide a copy of all manufacturer specifications and cutsheets. Provide text-searchable, high-quality document files from the manufacturer's online or electronic documentation. Color documents are preferred. Provide documents specific to the product(s) installed under this Contract. Provide identification and coverage for the parts of each component, assembly, subassembly, and accessory of the end items subject to replacement. Provide Uniformat II Level 3 identification for D20, D30, D40 installed equipment. When possible, do not submit document files containing multiple product catalogs from the same manufacturer, or product data from multiple manufacturers in the same files. Provide documents directly from the manufacturer whenever possible. Do not provide scanned copies of hardcopy documents. Provide identification and coverage for the parts of each component, assembly, subassembly, and accessory of the end items subject to replacement. Include special hardware requirements, such as requirement to use high-strength bolts and nuts. Identify parts by make, model, serial number, and source of supply to allow reordering without further identification. Provide clear and legible illustrations, drawings, and exploded views to enable easy identification of the items. When illustrations omit the part numbers and description, both the illustrations and separate listing must show the index, reference, or key number that will cross-reference the illustrated part to the listed part. Group the parts shown in the listings by components, assemblies, and subassemblies in accordance with the manufacturer's standard practice. Parts data may cover more than one model or series of equipment, components, assemblies, subassemblies, attachments, or accessories, such as typically shown in a master part catalog.

1.6.3.4 Approved Submittals and Certificates

Provide a copy of all submittals documented with the required approval as applicable for each UFGS specification listed in the table outlined in applicable specifications. Include copies of SD-07 Certificates submittals documented with the required approval, SD-08 Manufacturer's Instructions submittals documented with the required approval, and SD-10 Operation and Maintenance Data submittals documents with the required approval.

1.6.3.5 Approved Coordination/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.

1.6.4 Sequence of Operation for Operating Equipment

Provide record one-line diagrams for each floor, delineating mechanical equipment location within the building. Provide specific instructions, procedures, and illustrations for the following phases of operation for the installed model and features of each system:

1.6.4.1 Safety Precautions and Hazards

List personnel hazards and equipment or product safety precautions for operating conditions. List all residual hazards identified in the Activity Hazard Analysis provided under Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS. Provide recommended safeguards for each identified hazard. Specify if any certifications or licenses are required to operate the equipment.

1.6.4.2 Operator Prestart

Provide procedures required to install, set up, and prepare each system for use.

1.6.4.3 Startup, Shutdown, and Post-Shutdown Procedures

Provide narrative description for Startup, Shutdown and Post-shutdown operating procedures including the control sequence for each procedure.

1.6.4.4 Normal Operations

Provide Control Diagrams with data to explain operation and control of systems and specific equipment. Provide narrative description of Normal Operating Procedures.

1.6.4.5 Emergency Operations

Provide Emergency Procedures for equipment malfunctions to permit a short period of continued operation or to shut down the equipment to prevent further damage to systems and equipment. Provide Emergency Shutdown Instructions for fire, explosion, spills, or other foreseeable contingencies. Provide guidance and procedures for emergency operation of utility systems including required valve positions, valve locations and zones or portions of systems controlled.

1.6.4.6 Operator Service Requirements

Provide instructions for services to be performed by the operator such as lubrication, adjustment, inspection, and recording gauge readings.

1.6.4.7 Environmental Conditions

Provide a list of Environmental Conditions (temperature, humidity, and other relevant data) that are best suited for the operation of each product, component or system. Describe conditions under which the item equipment should not be allowed to run.

1.6.4.8 Operating Log

Provide forms, sample logs, and instructions for maintaining necessary operating records.

1.6.4.9 Additional Requirements for Equipment Control Systems

Provide Data Package 5 and the following for all control systems:

a. Provide a narrative description on how to perform and apply functions, features, modes, and other operations, including unoccupied operation, seasonal changeover, manual operation, and alarms. Include detailed technical manual for programming and customizing control loops and algorithms.

b. Submit complete controls equipment schedules, full as-built sequence of operations, wiring and logic diagrams, Input/Output Tables, equipment schedules, copies of checkout tests and calibrations performed by the Contractor (not Cx tests), and all associates information.

c. Full points list. Provide a listing of rooms with the following information for each room:

(1) Floor

(2) Room number

(3) Room name

(4) Air handler unit ID

(5) Reference drawing number

(6) Air terminal unit tag ID

(7) Heating or cooling valve tag ID

(8) Minimum cfm

(9) Maximum cfm

d. Full print out of all schedules and set points after testing and acceptance of the system.

e. Full as-built print out of software program.

f. Marking of system sensors and thermostats on the as-built floor plan and mechanical drawings with their control system designations.

1.6.4.10 Testing Equipment Information and Performance Data

Include information on test equipment required to perform specified tests and on special tools needed for the operation, maintenance, and repair of components. Provide final set points.

Include completed prefunctional checklists, functional performance test forms, and monitoring reports. Include recommended schedule for retesting

and blank test forms. Provide final set points.

1.6.5 Routine Maintenance Requirements

1.6.5.1 Preventive Maintenance Plan, Schedule, and Procedures

Provide manufacturer's schedule for routine preventive maintenance, inspections, condition monitoring (predictive tests) and adjustments required to ensure proper and economical operation and to minimize repairs. Provide instructions stating when the systems should be retested. Provide manufacturer's projection of preventive maintenance work-hours on a daily, weekly, monthly, and annual basis including requirements by type of activity. For periodic calibrations, provide manufacturer's specified frequency and procedures for each separate operation.

a. Define the anticipated time required to perform each test (work-hours), test apparatus, number of personnel identified by responsibility, and a testing validation procedure permitting the record operation capability requirements within the schedule. Provide a remarks column for the testing validation procedure referencing operating limits of time, pressure, temperature, volume, voltage, current, acceleration, velocity, alignment, calibration, adjustments, cleaning, or special system notes. Delineate procedures for preventive maintenance, inspection, adjustment, lubrication and cleaning necessary to minimize repairs.

b. Repair requirements must inform operators how to check out, troubleshoot, repair, and replace components of the system. Include electrical and mechanical schematics and diagrams and diagnostic techniques necessary to enable operation and troubleshooting of the system after acceptance.

1.6.5.2 Lubrication Data

Include the following preventive maintenance lubrication data, in addition to instructions for lubrication required under paragraph OPERATOR SERVICE REQUIREMENTS:

a. A table showing recommended lubricants for specific temperature ranges and applications.

b. Charts with a schematic diagram of the equipment showing lubrication points, recommended types and grades of lubricants, and capacities. Provide procedural instructions for Oil Sampling for all equipment.

c. A Lubrication Schedule showing service interval frequency.

1.6.6 Repair Procedures

Provide instructions and a list of tools required to repair or restore the product or equipment to proper condition or operating standards. Provide manufacturer's recommended procedures and instructions for correcting problems and making repairs for the installed model and features of each system. Include potential environmental and indoor air quality impacts of recommended maintenance procedures and materials. Specify if any certifications or licenses are required to repair the equipment.

1.6.6.1 Troubleshooting Guides and Diagnostic Techniques

Provide step-by-step procedures to promptly isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or require replacement.

1.6.6.2 Wiring Diagrams and Control Diagrams

Provide point-to-point drawings of wiring and control circuits including factory-field interfaces. Provide a complete and accurate depiction of the actual job specific wiring and control work. On diagrams, number electrical and electronic wiring and pneumatic control tubing and the terminals for each type, identically to actual installation configuration and numbering.

1.6.6.3 Removal and Replacement Instructions

Provide step-by-step procedures and a list of required specialty tools and supplies for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings and adjustments required. Use a combination of text and illustrations.

1.6.6.4 Repair Work-Hours

Provide manufacturer's projection of repair work-hours including requirements by type of craft. Identify, and tabulate separately, repair that requires the equipment manufacturer to complete or to participate.

1.6.6.5 Warranty Information

List and explain the various warranties and clearly identify the servicing and technical precautions prescribed by the manufacturers or contract documents in order to keep warranties in force. Identify if replacement of a subassembly, attachment or accessory requires the entire assembly to be replaced. Include warranty information for primary components of the system. Provide copies of warranties required by Section 01 78 00 CLOSEOUT SUBMITTALS.

1.6.6.6 Extended Warranty Information

List all warranties for products, equipment, components, and sub-components whose duration exceeds one year. 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 the specific operation and maintenance procedures that must be performed to keep the warranty valid. Provide copies of warranties required by Section 01 78 00 CLOSEOUT SUBMITTALS.

1.6.6.7 Record Drawings and Utility Systems

The record drawings are the final compilation of actual conditions reflected in the as-built drawings. Provide record drawings as outlined in 01 78 00 CLOSEOUT SUBMITTALS.

Using Record Source Drawings, show and document details of the actual installation of the utility systems, annotate and highlight the Operation

and Maintenance information. Provide the following drawings at a large enough scale to differentiate designated isolation units from surrounding valves and switches.

1.6.6.8 Personnel Training Requirements

Provide information available from the manufacturers that is needed for use in training designated personnel to properly operate and maintain the equipment and systems.

1.6.6.9 Contractor / Supplier Listing and Contact Information

Provide a list that includes the name, address, telephone number, email and website of the General Contractor and each Subcontractor who installed the product or equipment, or system. For each item, also provide the name address and telephone number of the manufacturer's representative and service organization that can provide replacements most convenient to the project site. Provide the name, address, and telephone number of the product, equipment, and system manufacturers.

1.6.7 Part 4: Facility Operations

1.6.7.1 Completed Facility Operating Plan

Provide a plan that documents that procedures for the operation of systems and assemblies in the facility. The systems that should be included in the Operating Plan include, but are not limited to:

a. Electrical systems and equipment

b. Mechanical systems and equipment

c. Fire Protection systems and equipment

d. Control Systems and equipment

e. Architectural and Structural systems, fixtures, structures, and equipment

f. Vertical transportation such as elevators and escalators

1.6.7.2 Testing Equipment and Special Tool Information

Include information on test equipment required to perform specified tests and on special tools needed for the operation, maintenance, and repair of components. Provide final set points.

1.6.7.3 Testing and Performance Data

Include completed prefunctional checklists, functional performance test forms, and monitoring reports. Include recommended schedule for retesting and blank test forms. Provide final set points.

1.6.7.4 Approved Field Test Reports and Manufacturer's Field Reports

Compile and provide approved Field Test Reports (SD-06) and Manufacturer's Field Reports (SD-09) submittals.

1.6.7.5 Maintenance Plans, Procedures, Checklists, Records, and Spare Parts Inventory

1.6.7.5.1 Maintenance Schedules

Include recommended maintenance schedules for systems and equipment.

1.6.7.5.2 Ongoing Commissioning Operational and Maintenance Record Keeping

Include ongoing commissioning and optimization procedures and documentation to monitor and improve the performance of facility systems.

1.6.7.5.3 Janitorial and Cleaning Plans and Procedures

Include a copy of facility cleaning and janitorial plan with procedures and intended chemicals and equipment.

Provide environmentally friendly cleaning recommendations in accordance with ASTM E1971.

1.6.7.6 Utility Record Drawings

1.6.7.6.1 Utility Schematic Diagrams

Provide a one-line schematic diagram for each utility system such as power, water, wastewater, and gas/fuel. Schematic diagram must show from the point where the utility line is connected to the mainline up to the 5 foot connection point to the facility. Indicate location or area designation for route of transmission or distribution lines; locations of duct banks, manholes/handholes or poles; isolation units such as valves and switches; and utility facilities such as pump stations, lift stations, and substations.

1.6.7.6.2 Enlarged Connection and Cutoff Plans

Provide enlarged floor plans and provide information between the 5 foot utilities connection point and where utilities connect to facility distribution. Enlarge floor plans/elevations of the rooms where the utility enters the building and indicate on these plans the locations of the main interiors and exterior connection and cutoff points for the utilities. Also enlarge floor plans/elevations of the rooms where equipment is located. Include enough information to enable someone unfamiliar with the facility to locate the connection and cutoff points. Indicate designations such as room number, panel number, circuit breaker, or valve number of each utility and equipment connection and cutoff point, and what that connection and cutoff point controls.

1.6.7.6.2.1 Description of Utility Metering and Monitoring Systems

Provide in narrative format a description of the utility metering and monitoring systems. Include locations, function, and related systems.

1.6.7.6.2.2 Procedures for Tracking Utility Use and Reporting

Procedures for usage reporting and tracking in support of establishing and monitoring utility budgets and costs, and in developing annual energy reports.

1.6.7.6.2.3 One-Line Diagrams and Meter Location of System

Provide one-line diagrams and design drawings that highlight meter locations on the site.

1.6.7.6.3 Spare Parts and Supply Lists

Provide lists of spare parts and supplies required for repair to ensure continued service or operation without unreasonable delays. Special consideration is required for facilities at remote locations. List spare parts and supplies that have a long lead-time to obtain.

1.6.8 Part 5: Training

Provide a copy of training plans used for each type of equipment along with training materials used, arranged in specification sequence. Provide a copy of training records, sign-in sheets, and agendas. Include training and documentation on the updating and continued use of the O&M Manual.

1.6.9 Part 6: Cx Project Report and TAB Report

Provide the final Cx Plan and complete Cx reports with evaluation and testing forms and records for each building system. Include relevant commissioned system assemblies test reports including installers checklists of assemblies. Provide all Cx Progress Reports, issues and resolutions logs with resolution or status of each item, and a list of any open items and seasonal or additional testing required.

1.6.10 Part 7: Regulatory Requirements

Provide information describing regulatory and policies compliance requirements or provide a reference to where it is stored.

1.6.11 Part 8: Permits

Provide information requiring frequently asked questions and associated answers or provide a reference to where it is stored.

1.6.12 Part 9: Operations and Maintenance Manual Approval

Provide a signed document stating that the project O&M Manual has been reviewed and confirming agreement with the approach it presents. Include contact information for the signer for coordination of any future changes.

1.7 SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES

Provide the O&M data packages specified in individual technical sections. O&M Data Packages are one of the components of the O&M Manual. The information required in each type of data package follows:

1.7.1 Package Quality

Documents must be fully legible. Operation and Maintenance data must be consistent with the manufacturer's standard brochures, schematics, printed instructions, general operating procedures, and safety precautions.

1.7.2 Data Package 1

a. Safety precautions and hazards

b. Cleaning recommendations

c. Maintenance and repair procedures

d. Warranty information

e. Extended warranty information

f. Contractor information

g. Spare parts and supply list

1.7.3 Data Package 2

a. Safety precautions and hazards

b. Normal operations

c. Environmental conditions

d. Lubrication data

e. Preventive maintenance plan, schedule, and procedures

f. Cleaning recommendations

g. Maintenance and repair procedures

h. Removal and replacement instructions

i. Spare parts and supply list

j. Parts identification

k. Warranty information

l. Extended warranty information

m. Contractor information

1.7.4 Data Package 3

a. Safety precautions and hazards

b. Operator prestart

c. Startup, shutdown, and post-shutdown procedures

d. Normal operations

e. Emergency operations

f. Environmental conditions

g. Operating log

h. Lubrication data

i. Preventive maintenance plan, schedule, and procedures

j. Cleaning recommendations

k. Troubleshooting guides and diagnostic techniques

l. Wiring diagrams and control diagrams

m. Maintenance and repair procedures

n. Removal and replacement instructions

o. Spare parts and supply list

p. Product submittal data

q. O&M submittal data

r. Parts identification

s. Warranty information

t. Extended warranty information

u. Testing equipment and special tool information

v. Testing and performance data

w. Contractor information

x. Field test reports

1.7.5 Data Package 4

a. Safety precautions and hazards

b. Operator prestart

c. Startup, shutdown, and post-shutdown procedures

d. Normal operations

e. Emergency operations

f. Operator service requirements

g. Environmental conditions

h. Operating log

i. Lubrication data

j. Preventive maintenance plan, schedule, and procedures

k. Cleaning recommendations

l. Troubleshooting guides and diagnostic techniques

m. Wiring diagrams and control diagrams

n. Repair procedures

o. Removal and replacement instructions

p. Spare parts and supply list

q. Repair work-hours

r. Product submittal data

s. O&M submittal data

t. Parts identification

u. Warranty information

v. Extended warranty information

w. Personnel training requirements

x. Testing equipment and special tool information

y. Testing and performance data

z. Contractor information

aa. Field test reports

1.7.6 Data Package 5

a. Safety precautions and hazards

b. Operator prestart

c. Start-up, shutdown, and post-shutdown procedures

d. Normal operations

e. Environmental conditions

f. Preventive maintenance plan, schedule, and procedures

g. Troubleshooting guides and diagnostic techniques

h. Wiring and control diagrams

i. Maintenance and repair procedures

j. Removal and replacement instructions

k. Spare parts and supply list

l. Product submittal data

m. Manufacturer's instructions

n. O&M submittal data

o. Parts identification

p. Testing equipment and special tool information

q. Warranty information

r. Extended warranty information

s. Testing and performance data

t. Contractor information

u. Field test reports

v. Additional requirements for HVAC control systems

1.7.7 Changes to Submittals

Provide manufacturer-originated changes or revisions to submitted data if a component of an item is so affected subsequent to acceptance of the O&M Data. Submit changes, additions, or revisions required by the Contracting Officer for final acceptance of submitted data within 30 calendar days of the notification of this change requirement.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 TRAINING

Prior to acceptance of the facility by the Contracting Officer for Beneficial Occupancy, provide comprehensive training for the systems and equipment specified in the technical specifications. The training must be targeted for the Facilities Management Specialist, building maintenance personnel, and applicable building occupants. Instructors must be well-versed in the particular systems that they are presenting. Address aspects of the Operation and Maintenance Manual submitted in accordance with Section 01 78 00 CLOSEOUT SUBMITTALS. Training must include classroom or field lectures based on the system operating requirements. The location of classroom training requires approval by the Contracting Officer.

3.1.1 Training Plan

Submit a written training plan to the Contracting Officer for approval at least 60 calendar days prior to the scheduled training. Training plan must be approved by the Commissioning Authority (CxA) prior to forwarding to the Contracting Officer. Also, coordinate the training schedule with the Contracting Officer and CxA. Include within the plan the following elements:

a. Equipment included in training

b. Intended audience

c. Location of training

d. Dates of training

e. Objectives

f. Outline of the information to be presented and subjects covered including description

g. Start and finish times and duration of training on each subject

h. Methods (e.g. classroom lecture, video, site walk-through, actual operational demonstrations, written handouts)

i. Instructor names and instructor qualifications for each subject

j. List of texts and other materials to be furnished by the Contractor that are required to support training

k. Description of proposed software to be used for video recording of training sessions.

3.1.2 Training Content

The core of this training must be based on manufacturer's recommendations and the operation and maintenance information. The CxA is responsible for overseeing and approving the content and adequacy of the training. Spend 95 percent of the instruction time during the presentation on the OPERATION AND MAINTENANCE DATA. Include the following for each system training presentation:

a. Start-up, normal operation, shutdown, unoccupied operation, seasonal changeover, manual operation, controls set-up and programming, troubleshooting, and alarms.

b. Relevant health and safety issues.

c. Discussion of how the feature or system is environmentally responsive. Advise adjustments and optimizing methods for energy conservation.

d. Design intent.

e. Use of O&M Manual Files.

f. Review of control drawings and schematics.

g. Interactions with other systems.

h. Special maintenance and replacement sources.

i. Tenant interaction issues.

3.1.3 Training Outline

Provide the Operation and Maintenance Manual Files (Bookmarked PDF) and a written course outline listing the major and minor topics to be discussed by the instructor on each day of the course to each trainee in the course. Provide the course outline 14 calendar days prior to the training.

3.1.4 Training Video Recording

Record classroom training session(s) on video. Provide to the Contracting Officer two copies of the training session(s) in DVD video recording format. Capture within the recording, in video and audio, the instructors' training presentations including question and answer periods with the attendees. The recording camera(s) must be attended by a person during the recording sessions to assure proper size of exhibits and projections during the recording are visible and readable when viewed as training.

3.1.5 Unresolved Questions from Attendees

If, at the end of the training course, there are questions from attendees that remain unresolved, the instructor must send the answers, in writing, to the Contracting Officer for transmittal to the attendees, and the training video must be modified to include the appropriate clarifications.

3.1.6 Validation of Training Completion

Ensure that each attendee at each training session signs a class roster daily to confirm Government participation in the training. At the completion of training, submit a signed validation letter that includes a sample record of training for reporting what systems were included in the training, who provided the training, when and where the training was performed, and copies of the signed class rosters. Provide two copies of the validation to the Contracting Officer, and one copy to the Operation and Maintenance Manual Preparer for inclusion into the Manual's documentation.

3.1.7 Quality Control Coordination

Coordinate this training with the CxA in accordance with Section 01 45 00 QUALITY CONTROL.

3.2 SUBMITTAL SCHEDULING

3.2.1 Operation and Maintenance Manual, Progress Submittal

Submit the Progress submittal when construction is approximately 50 percent complete, to the Contracting Officer for approval. Provide Operation and Maintenance Manual Files (Bookmarked PDF). Include the elements and portions of system construction completed up to this point. The purpose of this submittal is to verify progress is in accordance with contract requirements as discussed during the Operation and Maintenance Manual Coordination Meeting.

3.2.2 Operation and Maintenance Manual, Prefinal Submittal

Submit the 100 percent submittal of the Operation and Maintenance Prefinal Submittal to the Contracting Officer for approval a minimum of 90 calendar days prior to the Beneficial Occupancy Date (BOD).. This submittal must provide a complete, working document that can be used to operate and maintain the facility. Any portion of the submittal that is incomplete or inaccurate requires the entire submittal to be returned for correction. Any discrepancies discovered during the Government's review of Operation and Maintenance Progress submittal must be corrected prior to the Prefinal submission. The Prefinal Submittal must include Operation and Maintenance Manual Files (Bookmarked PDF).

3.2.3 Operation and Maintenance Manual, Final Submittal

Submit completed Operation and Maintenance Manual Files (Bookmarked PDF). The Final submittal is due at BOD. Any discrepancies discovered during the Government's review of the Prefinal submittal, including the Field Verification, must be corrected prior to the Final submission.

-- End of Section --

SECTION 01 78 24.00 20

FACILITY DATA WORKBOOK (FDW)
05/23, CHG 1: 11/23

PART 1 GENERAL

1.1 DEFINITIONS AND ABBREVIATIONS

1.1.1 eOMSI

Electronic Operation and Maintenance Support Information

1.1.2 Facility Data Workbook (FDW)

A Microsoft Excel file containing required facility information populated by the Contractor.

1.1.3 Systems

The words "system", "systems", and "equipment", when used in this document refer to as-built systems and equipment.

1.1.4 KTR

An abbreviation for "Contractor."

1.2 OPERATION AND MAINTENANCE MANUAL AND FACILITY DATA WORKBOOK MEETINGS

1.2.1 Post-Award Kickoff Meeting

Meeting requirements are identified in Section 01 78 23 OPERATION AND MAINTENANCE DATA.

1.3 SUBMITTAL SCHEDULING

1.3.1 Facility Data Workbook (FDW), Progress Submittal

Submit the Progress submittal when construction is approximately 50 percent complete, to the Contracting Officer for approval. Provide Facility Data Workbook (Excel). Include the elements and portions of system construction completed up to this point.

The purpose of this submittal is to verify progress is in accordance with contract requirements as discussed during the Operation and Maintenance Manual and Facility Data Workbook Meetings. Field verify a portion of the eOMSI information in accordance with paragraph FIELD VERIFICATION.

1.3.2 Facility Data Workbook (FDW), Prefinal Submittal

Submit the 100 percent submittal of the FDW Prefinal Submittal to the Contracting Officer for approval within 90 calendar days of the Beneficial Occupancy Date (BOD). This submittal must provide a complete, working document that can be used to operate and maintain the facility. Any portion of the submittal that is incomplete or inaccurate requires the entire submittal to be returned for correction. Any discrepancies discovered during the Government's review of FDW Progress submittal must be corrected prior to the Prefinal submission.

1.3.3 Facility Data Workbook (FDW), Final Submittal

Submit completed Facility Data Workbook (Excel). The Final submittal is due at BOD. Any discrepancies discovered during the Government's review of the Prefinal eOMSI submittal, including the Field Verification, must be corrected prior to the Final eOMSI submission.

1.4 UNITS OF MEASURE

Provide FDW utilizing the units of measure required by the RFP for the facility. Refer to Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-11 Closeout Submittals

Facility Data Workbook (FDW), Progress Submittal; G

Facility Data Workbook (FDW), Prefinal Submittal; G

Facility Data Workbook (FDW), Final Submittal; G

PART 2 PRODUCTS

2.1 eOMSI FACILITY DATA WORKBOOK

Download the eOMSI Facility Data Workbook at the following location: https://www.wbdg.org/dod/ufgs/ufgs-forms-graphics-tables. Complete the KTR Facility Data File tab based on the selection of Mastersystems, Systems, and Subsystems installed. The following tabs are included in the eOMSI Facility Data File Workbook and serve the purpose stated:

a. Instructions Tab: Instructions for completing Model & Facility Data Matrix Tab and KTR Facility Data File Tab. If a discrepancy exists between what is required in this Section and the Workbook, the instructions within the workbook take precedence.

b. Model & Facility Data Matrix Tab: - The Matrix lists Required Facility Asset Fields for each SYSTEM and SUBSYSTEM. The Designer of Record selects SYSTEMS and SUBSYSTEMS that are within the project scope, which the Contractor needs to include and populate in KTR Facility Data File tab. The "Required Facility Asset Field Position Numbers," one through thirty-five, are pre-populated, and are not editable.

c. Required Facility Asset Fields Tab: Defines the 35 Required Facility Asset Field Position Numbers used in Model and Facility Data Matrix and KTR Facility Data File tabs.

d. KTR Sample Facility Data File Tab: Sample KTR eOMSI facility data file. This tab provides an example of the mandatory fields of equipment installed by the Contractor, and populated in the KTR eOMSI Facility Data File Tab, along with their descriptions.

e. KTR Facility Data File Tab: Required eOMSI facility data file deliverable provided to the Government. Provide a separate and unique new row for each facility component or piece of equipment installed. Coordinate with the Government's Contracting Officer's Representative and NAVFAC PW FMD for specific facility component naming convention.

PART 3 EXECUTION

3.1 FIELD VERIFICATION

Field verify Facility Data Workbook information with Contractor and Government personnel. Include the following personnel in this meeting: Contractor's Facility Data Workbook Preparer and Quality Control Manager, Commissioning Authority, and the Government's Contracting Officer's Representative and NAVFAC PW FMD. Request, and provide, an eOMSI Field Verification Meeting no sooner than 14 calendar days after submission of the Progress FDW submittal, and another, no sooner than 14 calendar days after submission of the Prefinal FDW submittal. During this meeting, the Government and Contractor will verify that the Facility Data Workbook is complete and accurate.

Field verify that at least 5 Subsystems under each of the Mastersystems are accurate, for a total of 25 Subsystems. For each of these items, verify that the required facility asset field, as defined in the "Model & Facility Data Matrix" tab, contains the specified data and it is accurate (i.e., item description, manufacturer, model no., serial no.). 100 percent accuracy of eOMSI information is required for successful field verification. If data discrepancies are discovered amongst the 25 Subsystems verified, resubmit an updated eOMSI FDW, and request a make-up field verification meeting. At the make-up field verification meeting 25 new Subsystems and their associated required facility asset fields will be field verified; the 25 new Subsystems must be 100 percent accurate. Any discrepancies discovered must be corrected prior to next eOMSI Facility Data Workbook Submittal.

(1) D10 - CONVEYING
(2) D20 - PLUMBING
(3) D30 - HVAC
(4) D40 - FIRE PROTECTION
(5) D50 - ELECTRICAL

-- End of Section --

SECTION 01 91 00.15 22

TOTAL BUILDING COMMISSIONING
08/24

PART 1 GENERAL

1.1 SUMMARY

The Government has hired an independent Commissioning Firm.

This Section specifies the scope of work for the entire Commissioning Team which includes the scope of work for the Lead Commissioning Specialist, Commissioning Specialists, Designers of Record, Installing Contractors, and Equipment Suppliers. Refer to paragraph COMMISSIONING TEAM for descriptions of Commissioning Team members and assigned responsibilities.

1.2 COMMISSIONING LIMITATIONS

Commissioning Requirements specified in this Section are prohibited from fulfilling requirements specified in other Sections. Requirements specified in other Sections are prohibited from fulfilling requirements specified in this Section.

1.3 SYSTEMS TO BE COMMISSIONED

Commissioning must be performed for equipment, systems, and assemblies listed under each systems category in the following paragraphs whether or not listed equipment, system, or assembly is required to be commissioned by any reference related to Sustainability TPC.

Specified equipment, systems, and assemblies are for all commissioned buildings in this project. Refer to items entitled "Sample Strategy" in this Section that must be applied.

1.3.1 Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category

a. Heating, ventilating, air-conditioning, and refrigeration systems (mechanical and passive) and associated controls.

b. Air-curtain systems.

c. Renewable energy systems and energy storage systems

d. Energy and building management and demand-control systems.

1.3.2 Plumbing Systems Category

a. Solenoid Actuated Fixtures.

b. Domestic hot-water systems and controls.

c. Service water pressure-booster pump systems and controls.

d. Water pumping and mixing systems over 5 hp and purification systems.

e. Irrigation system performance that uses more than 1000 gal per day.

f. Renewable energy systems.

1.3.3 Utility Systems Category

a. Whole-building energy utility metering systems.

b. Whole-building water utility metering systems.

1.3.4 Electrical Type I Systems Category

a. Power - cathodic protection systems.

b. Power - distribution systems.

c. Power - service systems.

d. Power - transformers.

1.3.5 Electrical Type II Systems Category

a. 400-Hertz solid-state frequency converters.

b. Energy monitoring for individual energy monitoring of total electrical energy, HVAC systems, interior lighting, exterior lighting, and receptacle circuits.

c. Lighting systems: lighting systems, automatic and manual daylighting controls, occupancy sensing devices, automatic shut-off controls, time switching, lighting control devices, lighting control systems, and dimming systems.

d. Metering: Electrical utility metering systems.

e. Photovoltaic systems.

f. Power systems: automatic receptacles controls.

1.3.6 Building Envelope Systems, Components, and Assemblies Category

a. Building envelope systems including curtain walls, exterior penetrations, exterior air barrier assemblies, exterior windows, exterior doors, and skylights.

b. Roofing including low sloped roofs and steep sloped roofs.

1.4 COMPLEX SYSTEMS

Complex systems are defined as the following systems categories as listed under paragraph SYSTEMS TO BE COMMISSIONED with appropriate qualifiers and are subject to more stringent requirements as specified in this Section.

a. All equipment, systems, and assemblies listed under item entitled "Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category."

b. All equipment, systems, and assemblies listed under item entitled "Plumbing Systems Category" featuring on-board factory packaged controls such as domestic heating hot water systems, domestic solar heating hot water systems, and service water pressure-booster pump systems. Refer to the following paragraph for definition of equipment

featuring on-board factory packaged controls.

c. All equipment, systems, and assemblies listed under item entitled "Utility Systems Category."

Equipment featuring on-board factory packaged controls is defined as equipment that is a complex system as defined in paragraph COMPLEX SYSTEMS which features a controller issuing sophisticated logic-based commands to its internal components to accomplish the intent of Plans and Specifications. This equipment may function as either a stand-alone piece of commissioned equipment or may function as part of a commissioned system. This controller may be equipment mounted or may be remote mounted and may or may not interface with a building control system. Examples of equipment meeting and not meeting this definition are provided in the following paragraphs.

a. Equipment meeting this definition includes chillers, boilers provided with or without master controllers, packaged pumping systems, dedicated outside air systems, packaged rooftop units, computer room air conditioners, and air terminal units.

b. Equipment not meeting this definition includes unitary air-conditioners, packaged terminal air-conditioners, and heat pumps.

c. Equipment not meeting this definition, but requiring demonstration of minimum safe motor speed either prior to or during Functional Performance Testing includes variable frequency drives.

1.5 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 SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 90.1 - IP	(2019; Errata 1 2019; Errata 2-5 2020; Addenda BY-CP 2020; Addenda AF-DB 2020; Addenda A-G 2020; Addenda F-Y 2021; Errata 6-8 2021; Interpretation 1-4 2020; Interpretation 5-8 2021 Addenda AS-AQ2022) Energy Standard for Buildings Except Low-Rise Residential Buildings

GREEN BUILDING INITIATIVE (GBI)

GBI DOD GP Compliance	GBI Department of Defense Guiding Principles Compliance Program for New Construction

1.6 SUBMITTALS

Commissioning Submittals are not required to be submitted by the Installing Contractor. Exchange of information between the Commissioning Team specified in this Section must still occur.

1.7 COMMISSIONING TEAM

The Commissioning Team is defined as the entity that must perform all Commissioning Activities specified in this Section for systems listed under paragraph SYSTEMS TO BE COMMISSIONED. The Commissioning Team is composed of the Lead Commissioning Specialist, Commissioning Specialists, Designers of Record, Installing Contractors, Equipment Suppliers, and the Contracting Officer's Technical Representative.

1.7.1 Lead Commissioning Specialist

The Lead Commissioning Specialist (CxC) is defined as the entity that must perform all Commissioning Responsibilities assigned in this Section that includes, but is not limited to, coordinating all aspects of the Commissioning Process; managing all Commissioning Specialists; and submitting all Commissioning Plans, schedules, reports, and documentation directly to the Contracting Officer's Technical Representative as modified in this Section.

1.7.2 Commissioning Specialists

Commissioning Specialists are defined as entities that must perform all Commissioning Responsibilities assigned in this Section that includes, but is not limited to, performing reviews, witnessing that all system components have been installed, that each control device operates, that each equipment piece operates, that complete systems operate, and that interactive systems operate in accordance with Plans and Specifications.

Commissioning Specialists must perform assigned responsibilities for equipment, systems, and assemblies listed under systems categories assigned to them in this Section. Commissioning Specialists are prohibited from performing responsibilities for equipment, systems, and assemblies listed under systems categories assigned to other Commissioning Specialists.

1.7.3 Designers of Record

Designers of Record are defined as entities that must act as design professionals responsible for design of their respective system that is subject to Commissioning. Designers of Record must perform all Commissioning Responsibilities assigned in this Section as directed by the General Contractor.

1.7.4 Installing Contractors

Installing Contractors are defined as the General Contractor's Superintendent or Project Manager; Quality Control Representative; and Mechanical, Controls, Plumbing, Electrical, Test and Balance, Fire Protection, and Building Envelope Sub-Contractors who provide, install, or construct systems in whole or in part for this contract. The General Contractor must provide a Lead Commissioning Representative to manage all Designers of Record, Sub-Contractor Commissioning Representatives, and Equipment Suppliers to accomplish all responsibilities assigned in this Section. Each Sub-Contractor must provide a Commissioning Representative to coordinate and perform all Commissioning Responsibilities for Commissioned equipment, systems, and assemblies provided as part of their respective contract as directed by the General Contractor. Submission of Commissioning related certifications or qualifications for the Lead Commissioning Representative and Installing Contractor Representatives is

not required.

Installing Contractors must perform all Commissioning Responsibilities assigned in this Section that includes, but is not limited to, demonstrating performance of all commissioned equipment, systems, and assemblies provided as part of their respective contract and must provide all necessary materials, services, and labor required for successful demonstration as modified in this Section.

1.7.5 Equipment Suppliers

Equipment Suppliers (ES) are defined as factory authorized start-up technicians or factory representatives knowledgeable with start-up, demonstration, and testing of commissioned equipment featuring on-board factory packaged controls provided as part of their respective contract. Each Equipment Supplier must coordinate and perform all Commissioning Responsibilities assigned in this Section as directed by the General Contractor. Submission of Commissioning related certifications or qualifications for Equipment Suppliers is not required. Refer to paragraph COMPLEX SYSTEMS for definition of equipment featuring on-board factory packaged controls's.

Equipment Suppliers must perform all Commissioning Responsibilities assigned in this Section that includes, but is not limited to, demonstrating performance of all commissioned equipment provided as part of their respective contract and must provide all necessary materials, services, and labor required for successful demonstration of all commissioned equipment provided as part of their respective contract as modified in this Section.

1.7.6 Installing Contractors and Equipment Suppliers Coordination

Installing Contractors and Equipment Suppliers must coordinate and share demonstration and testing responsibilities specified in this Section for commissioned equipment featuring on-board factory packaged controls. Installing Contractors and Equipment Suppliers must simultaneously perform all aspects of demonstration and testing for these types of systems. Refer to paragraph COMPLEX SYSTEMS for definition of equipment featuring on-board factory packaged controls.

1.7.7 Contracting Officer's Technical Representative

The Contracting Officer's Technical Representative (COTR) represents the Government for all elements of the Commissioning Process. The COTR will serve as the single point of contact with the Lead Commissioning Specialist, will receive all Commissioning Submittals, may attend meetings, and may, but is not required to, witness field inspections and testing specified in this Section.

1.8 COMMUNICATIONS

1.8.1 Communications with the Contracting Officer's Technical Representative

Communication with the Contracting Officer's Technical Representative must be through the Lead Commissioning Specialist who acts as the single direct point of contact for all aspects of the Commissioning Process.

1.8.2 Communications between the Commissioning Team

Communications between the Commissioning Team including, but not limited to, verbal communications, schedule information, and exchange of information specified in this Section, must occur directly between the Commissioning Team without requiring interaction of the Contracting Officer's Technical Representative.

1.9 NUMBER OF BUILDINGS AND CONSTRUCTION PHASING

1.9.1 Number Of Buildings

This project includes one commissioned building.

a. Commissioning Design Reviews specified in this section must be performed as a single review for each submission inclusive of all commissioned buildings in this project. Refer to item entitled "Commissioning Design Reviews" for additional requirements.

b. Construction Phase Site Observations specified in this Section are inclusive of all commissioned buildings in this project. Refer to item entitled "Construction Phase Site Observations" for additional requirements.

c. Construction Phase Functional Performance Testing must be performed during a single continuous occurrence inclusive of all commissioned buildings for each systems category until completion of testing of all systems listed under respective systems category. Refer to item entitled "Construction Phase Functional Performance Testing" for additional requirements.

d. Post-Construction Phase Site Observations specified are inclusive of all commissioned buildings in this project. Refer to item entitled "Post-Construction Phase Site Observations" for additional requirements.

1.9.2 Construction Phasing

This project's construction is not phased.

1.10 ASHRAE STANDARD 90.1 COMMISSIONING COMPLIANCE

ASHRAE Standard 90.1 Commissioning compliance is required for this project.

1.10.1 General Requirements

All Commissioning Activities referred to as "Building Systems Verification and Testing" and "Building Commissioning" in ASHRAE 90.1 - IP as modified in this Section, Commissioning Activities listed in references contained in ASHRAE 90.1 - IP's paragraphs as modified in this Section, and Commissioning Activities specified in this Section must be performed. All Commissioning Activities that are referred to as "optional activities," "guidance," "should activities," "recommendations," "suggested practices," "informative information," or listed as similar designations are mandatory regardless of any qualifiers.

1.10.2 Commissioning Team Responsibilities

The Commissioning Team must, at a minimum, perform all Commissioning

Activities specified in the preceding item entitled "General Requirements" and must perform all Commissioning Activities specified in this Section. This Section takes precedence should there be a conflict between requirements listed in this Section and requirements listed in ASHRAE 90.1 - IP or listed in any of its references.

1.11 SUSTAINABILITY THIRD PARTY CERTIFICATION (TPC) COMMISSIONING COMPLIANCE

Sustainability Third Party Certification (TPC) is required for this project.

1.11.1 General Requirements

All Commissioning Activities listed in all references for pursuing Sustainability TPC as modified in this Section and Commissioning Activities specified in this Section must be performed. All Commissioning Activities that are referred to as "optional activities," "guidance," "should activities," "recommendations," "suggested practices," "informative information," or listed as similar designations are mandatory regardless of any qualifiers and whether or not activity is included as total points toward Sustainability TPC.

1.11.2 Commissioning Team Responsibilities

The Commissioning Team must, at a minimum, perform all Commissioning Activities specified in the preceding item entitled "General Requirements," perform Commissioning Activities listed in the reference for pursuing Sustainability TPC, GBI DOD GP Compliance, as modified in this Section, perform Commissioning Activities listed in all of its references as modified in this Section, and perform Commissioning Activities specified in this Section. This Section takes precedence should there be a conflict between requirements listed in this Section and requirements listed in the reference for pursuing Sustainability TPC or listed in any of its references.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 DESIGN PHASE

3.1.1 Design Phase ASHRAE Standard 90.1 Commissioning Compliance

3.1.1.1 General Requirements

Activities must include, but not be limited to, Design Phase Commissioning Activities referred to as "Building Systems Verification and Testing" and "Building Commissioning" in ASHRAE 90.1 - IP as modified in this Section, Design Phase Commissioning Activities listed in references contained in ASHRAE 90.1 - IP as modified in this Section, and Design Phase Commissioning Activities specified in this Section.

3.1.1.2 Lead Commissioning Specialist and Commissioning Specialists Responsibilities

The Lead Commissioning Specialist and Commissioning Specialists must, at a

minimum, perform all activities specified under item entitled "Design Phase ASHRAE Standard 90.1 Commissioning Compliance."

3.1.2 Design Phase Sustainability Third Party Certification (TPC) Commissioning Compliance

3.1.2.1 General Requirements

Activities must include, but not be limited to, Design Phase Commissioning Activities listed in the reference for pursuing Sustainability TPC, GBI DOD GP Compliance, as modified in this Section, Design Phase Commissioning Activities listed in all of its references as modified in this Section, and Design Phase Commissioning Activities specified in this Section.

3.1.2.2 Lead Commissioning Specialist and Commissioning Specialists Responsibilities

The Lead Commissioning Specialist and Commissioning Specialists must, at a minimum, perform activities specified in the following paragraphs.

a. The Lead Commissioning Specialist must submit all Design Phase documentation of Commissioning Activities directly to the Suitability TPC organization as modified in this Section.

b. The Lead Commissioning Specialist and Commissioning Specialists must perform all activities specified under item entitled "Design Phase Sustainability Third Party Certification (TPC)."

3.1.3 Design Phase Commissioning Coordination Meeting

3.1.3.1 General Requirements

A Design Phase Commissioning Coordination meeting must be conducted no later than 30 calendar days prior to the first Plans and Specifications submission or no later than 30 calendar days after approval of Commissioning Firm certifications and all Commissioning Specialist certifications, whichever occurs last. Meeting topics must include, but not be limited to, the Commissioning Process, contract requirements, lines of communication, roles and responsibilities, schedules, documentation requirements, and logistics as specified in this Section. Meeting must be conducted by conference call.

3.1.3.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, conduct meeting and prepare meeting minutes complete with Attendance Roster.

3.1.3.3 Designers of Record, Installing Contractors, and Others Responsibilities

Designers of Record and Installing Contractors must attend this meeting. The Contracting Officer's Technical Representative, a User Representative, and a Public Works Department Representative may also attend this meeting.

3.1.4 Design Phase Commissioning Plan

3.1.4.1 General Requirements

The Design Phase Commissioning Plan must be prepared specific to this construction and contents must include, but not be limited to, contents specified in the following paragraphs.

a. Plan purpose.

b. Overview of Commissioning Activities.

c. Commissioning scope.

d. Commissioning Process outline.

e. Detailed description of Commissioning Activities.

f. List of all commissioned equipment, systems, and assemblies.

g. Description of performance criteria.

h. Building information.

i. Contact information for the Lead Commissioning Specialist, Commissioning Specialists, Designers of Record, and Contracting Officer's Technical Representative.

j. Criteria listing including Unified Facilities Criteria and Building Codes and Standards.

k. Description of Commissioning Team members.

l. Roles and responsibilities.

m. Lines of communication.

n. Documentation requirements.

o. Description of Commissioning Plan distribution during the Design Phase and Construction Phase.

p. Description of Issues and Resolution Logs distribution during the Design Phase and Construction Phase.

q. Description of Commissioning testing document distribution during the Design Phase and Construction Phase.

r. Description of Commissioning report distribution during the Design Phase and Construction Phase.

s. Owner's Project Requirements.

t. Description of the Basis of Design.

u. Description of Plans and Specifications reviews performed by Commissioning Specialists.

v. Description of Plans and Specifications reviews performed by the

Contracting Officer's Technical Representative.

w. Examples and descriptions of Site Observation Reports and Issues And Resolution Log.

x. Listing and description of Design Phase and Construction Phase Commissioning meetings.

y. Identification of Commissioning Activities for incorporation into the Project Construction Schedule.

z. Listing of submittals required by Commissioning Specialists.

aa. Examples and description of the development of Pre-Functional Checklists and Functional Performance Test Checklists.

ab. Description of Pre-Functional Checks and Functional Performance Testing complete with sample strategies.

ac. Description of Ductwork Air Leak Test (DALT) field acceptance testing specified in Section 23 05 93.00 22 TESTING, ADJUSTING, AND BALANCING FOR MECHANICAL SYSTEMS.

ad. Description of Performance Verification Test (PVT) field acceptance testing specified in Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC.

ae. Description of Test and Balance (TAB) field acceptance testing specified in Section 23 05 93.00 22 TESTING, ADJUSTING, AND BALANCING FOR MECHANICAL SYSTEMS.

af. Identification of intervals at which a summary of Functional Performance Testing results will be provided to the Contracting Officer's Technical Representative for concurrence or acceptance.

ag. Listing of Operation and Maintenance Manual requirements.

ah. Description of Systems Manuals.

ai. Description of training requirements.

aj. Description of Final Commissioning Report.

3.1.4.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, prepare and submit the **Design Phase Commissioning Plan** no later than 45 calendar days after approval of Commissioning Specialists certifications.

File one copy of **Approved Design Phase Commissioning Plan** in the Sustainability eNotebook no later than 14 calendar days after receiving approval of the Design Phase Commissioning Plan.

3.1.5 Design Phase Issues And Resolution Log

3.1.5.1 General Requirements

The Design Phase Issues and Resolution Log must be prepared and maintained to track all Commissioning Issues identified by any member of the

Commissioning Team. The Design Phase Issues and Resolution Log must be prepared in an electronic format that can be used throughout the Design Phase such that it can be provided to the Government upon request. Design Phase Issues and Resolution Log contents must include, but not be limited to, contents specified in the following paragraphs.

a. Project title and location.

b. Lead Commissioning Specialist's contact information.

c. Issue number.

d. Date issue was discovered.

e. Name of Commissioning Team member identifying the issue.

f. Commissioning Team member responsible for resolving the issue.

g. Current status.

h. Issue description.

i. Pictures of item if available and appropriate.

j. Effects of issue on project or building operation.

k. Possible cause of issue.

l. Proposed resolution.

m. Final resolution and final resolution date.

n. Approvals of issue resolution, including approver's name.

3.1.5.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must prepare and maintain the **Design Phase Issues And Resolution Log** and must submit one electronic copy no later than seven calendar days after the addition of an issue or a change in status of an issue.

3.1.6 Commissioning Design Reviews

3.1.6.1 General Requirements

Commissioning Design Reviews must be performed using Government provided software in accordance with ASHRAE 90.1 - IP and reference for pursuing Sustainability TPC and must include, but not be limited to, review of each submission of the Owner's Project Requirements (OPR), Basis of Design (BOD), and Plans and Specifications specified in the following paragraphs, except for the last submission. Each review must include back-checks of deficiencies identified in preceding reviews. The last submission must include a review of the OPR, BOD, and back-check of deficiencies identified in preceding reviews, but not a complete Commissioning Design Review.

a. First submission: 35-Percent Documents.

b. Second submission: 65-Percent Documents.

c. Third submission: Pre-Final Documents.

d. Fourth submission: Final Documents.

Commissioning Design Reviews must assess completeness and clarity of the OPR, verify requirements stated in the OPR are addressed in the BOD, and verify Commissioning Aspects of the Plans and Specifications including preparation in accordance with the BOD. Commissioning Design Reviews must detail compliance with the OPR, must detail compliance with provisions of ASHRAE 90.1 - IP, and must identify deficiencies of commissioned equipment, systems, and assemblies that include, but not be limited to, deficiencies related to the following paragraphs as applicable to this project.

a. Adverse impacts on proper operation and maintenance.

b. Adequate accessibility for proper testing.

c. Proper specification of performance and testing criteria.

d. Proper specification of relevant control sensor and control device locations.

e. Completely, clearly, and correctly developed control sequences.

3.1.6.2 Commissioning Design Review Reports

A Commissioning Design Review Report must be prepared for each Commissioning Design Review. Each deficiency must be listed individually and must be separated into categories corresponding to systems categories listed under paragraph SYSTEMS TO BE COMMISSIONED. Commissioning Design Review Report contents must include, but not be limited to, contents specified in the following paragraphs.

a. Project title, project number, and date of review.

b. Executive summary.

c. List of Plans and Specifications reviewed.

d. Deficiency location.

e. Clear description of deficiencies complete with proposed corrective actions.

f. Relevant observations from similar applications.

g. Clarifying questions related to constructability and maintainability if necessary.

h. Compliance with provisions of ASHRAE 90.1 - IP.

Updated Commissioning Design Review Reports must be prepared to include resolution of outstanding issues reached during Commissioning Design Review meetings.

3.1.6.3 Commissioning Design Review Meetings

A Commissioning Design Review meeting must be conducted no later than 14 calendar days after preparation of each Commissioning Design Review Report to discuss proposed corrective actions and to resolve outstanding issues. The Contracting Officer's Technical Representative may attend these meetings. Meeting must be conducted by conference call.

3.1.6.4 Lead Commissioning Specialist Responsibilities

Lead Commissioning Specialist activities must include, but not be limited to, activities specified in the following paragraphs.

a. Prepare and provide Commissioning Design Review Reports to Designers of Record.

b. Conduct Commissioning Design Review meetings.

c. Update Commissioning Design Review Reports.

d. Prepare and submit **Updated Commissioning Design Review Reports** no later than 14 calendar days after each Commissioning Design Review meeting.

3.1.6.5 Commissioning Specialists Responsibilities

Commissioning Specialists activities must include, but not be limited to, performing Commissioning Design Reviews and attending Commissioning Design Review meetings for equipment, systems, and assemblies listed under systems categories assigned to them in this Section. Commissioning Specialists are prohibited from performing these responsibilities for equipment, systems, and assemblies listed under systems categories assigned to other Commissioning Specialists.

3.1.6.6 Designers of Record Responsibilities

Designers of Record activities must include, but not be limited to, providing written responses to Commissioning Design Review Reports, attending Commissioning Design Review meetings, implementing revisions to Plans and Specifications resulting from resolution of Commissioning Design Reports, and related activities assigned in other Sections.

3.2 CONSTRUCTION PHASE

3.2.1 Construction Phase ASHRAE Standard 90.1 Commissioning Compliance

3.2.1.1 General Requirements

Activities must include, but not be limited to, Construction Phase Commissioning Activities referred to as "Building Systems Verification and Testing" and "Building Commissioning" in ASHRAE 90.1 - IP as modified in this Section, Construction Phase Commissioning Activities listed in references contained in ASHRAE 90.1 - IP as modified in this Section, and Construction Phase Commissioning Activities specified in this Section.

3.2.1.2 Lead Commissioning Specialist and Commissioning Specialists Responsibilities

The Lead Commissioning Specialist and Commissioning Specialists must, at a

minimum, perform all activities specified under item entitled "Construction Phase ASHRAE Standard 90.1 Commissioning Compliance."

3.2.2 Construction Phase Sustainability Third Party Certification (TPC) Commissioning Compliance

3.2.2.1 General Requirements

Activities must include, but not be limited to, Commissioning Activities listed in the reference for pursuing Sustainability TPC, GBI DOD GP Compliance, as modified in this Section, Commissioning Activities listed in all of its references as modified in this Section, and Commissioning Activities specified in this Section.

3.2.2.2 Lead Commissioning Specialist and Commissioning Specialists Responsibilities

The Lead Commissioning Specialist and Commissioning Specialists must, at a minimum, perform activities specified in the following paragraphs.

a. The Lead Commissioning Specialist must submit all Construction Phase documentation of Commissioning Activities directly to the Suitability TPC organization as modified in this Section.

b. The Lead Commissioning Specialist and Commissioning Specialists must perform all activities specified under item entitled "Construction Phase Sustainability Third Party Certification (TPC)."

3.2.3 Construction Phase Sequencing

3.2.3.1 Heating, Ventilation, and Air-Conditioning (HVAC) Systems

Heating, ventilation, and air-conditioning (HVAC) systems activities specified in the following paragraphs must be performed as applicable prior to performing Functional Performance Testing of systems listed under item entitled "Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED.

a. All equipment, systems, and assemblies have been completed, cleaned, flushed, disinfected, calibrated, tested, and operate in accordance with Plans and Specifications.

b. All Ductwork Air Leakage Testing (DALT) field work, Test and Balance (TAB) field work, Pre-Final TAB Reports, and related prerequisites have been completed, submitted, and approved in accordance with Section 23 05 93.00 22 TESTING, ADJUSTING, AND BALANCING FOR MECHANICAL SYSTEMS.

c. All inspections, measurements, and testing of building envelope and roofing systems specified in Section 07 27 10 BUILDING AIR BARRIER SYSTEM have been completed, submitted, and approved.

d. All pressure testing, infrared thermography testing, and fog testing of building envelope and roofing systems specified in Section 01 91 19 BUILDING ENCLOSURE COMMISSIONING have been completed, submitted, and approved.

e. All Pre-Functional Checks have been completed, submitted, and approved.

f. Certified TAB Report specified in Section 23 05 93.00 22 TESTING, ADJUSTING, AND BALANCING FOR MECHANICAL SYSTEMS has been prepared, submitted, and approved.

g. Certified Certificate of Readiness has been completed, submitted, and approved.

All completed Final Functional Performance Test Checklists for commissioned equipment, systems, and assemblies listed under item entitled "Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must be submitted and approved prior to the Government performing any Performance Verification Testing specified in
Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC.

3.2.3.2 Electrical Systems

Electrical systems activities specified in the following paragraphs must be performed as applicable prior to performing Functional Performance Testing of systems listed under item entitled "Electrical Type II Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED.

a. All electrical, power generation, and lighting equipment, systems, and assemblies have been completed, calibrated, tested, and operate in accordance with Plans and Specifications.

b. Building Envelope has been enclosed according to contract documents and final construction has been completed.

c. All ceiling tiles, floor coverings, and window coverings have been put in place.

d. All lamps have completed a minimum 100-hour burn-in period.

e. All furniture has been put in place.

f. Certified Certificate of Readiness has been completed, submitted, and approved.

3.2.4 Construction Phase Scheduling

3.2.4.1 General Requirements

Commissioning Activities and other related activities for inclusion into the Project Construction Schedule must include, but not be limited to, activities specified in the following paragraphs.

a. Perform Construction Phase Commissioning Coordination meeting.

b. Submit and approve Construction Phase Interim Commissioning Plan.

c. Submit and approve Construction Phase Final Commissioning Plan.

d. Submit and approve completed Pre-Functional Checklists.

e. Submit and approve proposed Functional Performance Test Checklists.

f. Submit and approve final Functional Performance Test Checklists.

g. Perform Construction Phase Site Observations.

h. Perform inspections, measurements, and testing of building envelope and roofing systems specified in Section 07 27 10 BUILDING AIR BARRIER SYSTEM.

i. Perform pressure testing, infrared thermography testing, and fog testing of building envelope and roofing systems specified in Section 01 91 19 BUILDING ENCLOSURE COMMISSIONING.

j. Submit and approve Certified TAB Report specified in Section 23 05 93.00 22 TESTING, ADJUSTING, AND BALANCING FOR MECHANICAL SYSTEMS.

k. Submit and approve Certified Certificate of Readiness.

l. Witness Construction Phase Functional Performance Testing.

m. Correct deficiencies discovered during Construction Phase Functional Performance Testing.

n. Re-witness Construction Phase Functional Performance Testing.

o. Government Witness of Performance Verification Testing.

p. Correct deficiencies discovered during Performance Verification Testing.

q. Government Re-witness of Performance Verification Testing.

r. Provide all Systems Manuals contents.

s. Submit and approve completed Systems Manuals.

t. Perform training.

u. Submit and approve Final Commissioning Report.

v. Perform Post-Construction Phase Site Observations.

w. Witness Post-Construction Phase Functional Performance Testing if all requirements and activities for respective system could not be fully or successfully completed during the Construction Phase.

x. Correct deficiencies discovered during Post-Construction Phase Functional Performance Testing.

y. Re-witness Post-Construction Phase Functional Performance Testing.

3.2.4.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must request a current Project Construction Schedule from Installing Contractors no later than at the Construction Phase Commissioning Coordination Meeting and must prepare and provide to Installing Contractors a list of Commissioning Activities for inclusion into the Project Construction Schedule. The Lead Commissioning Specialist must associate each Commissioning Activity to a single construction activity such that if the date of the construction activity changes, the associated Commissioning Activity changes accordingly. List of Commissioning Activities for inclusion into the Project Construction

Schedule is not required to be submitted to the Government.

3.2.4.3 Installing Contractors Responsibilities

Installing Contractors must provide a current Project Construction Schedule to the Lead Commissioning Specialist upon receiving request. Installing Contractors must incorporate the list of Commissioning Activities into the Project Construction Schedule and must link each Commissioning Activity to the associated construction activity identified by the Lead Commissioning Specialist such that if the date of the construction activity changes, the associated Commissioning Activity changes accordingly.

Installing Contractors must provide updated Project Construction Schedules to the Lead Commissioning Specialist at least on a monthly basis.

3.2.5 Construction Phase Commissioning Coordination Meeting

3.2.5.1 General Requirements

A Construction Phase Commissioning Coordination meeting must be conducted no later than 90 calendar days after the beginning of construction to discuss topics that include, but not be limited to, the Commissioning Process, contract requirements, lines of communication, roles and responsibilities, Commissioning Activities for inclusion into the Project Construction Schedule, documentation requirements, Inspections and Testing, and logistics specified in this Section. Meeting must be conducted by conference call.

3.2.5.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, conduct meeting and prepare meeting minutes complete with Attendance Roster.

3.2.5.3 Installing Contractors, Designers of Record, and Other Commissioning Team Member Responsibilities

Installing Contractors and Designers of Record must attend this meeting. The Contracting Officer's Technical Representative, a User Representative, and a Public Works Department Representative may attend this meeting.

3.2.6 Construction Phase Commissioning Progress Meetings

3.2.6.1 General Requirements

Construction Phase Commissioning Progress meetings must be conducted to discuss topics that include, but not be limited to, unresolved Commissioning Issues, status of items specified to be provided to the Lead Commissioning Specialist, and upcoming Commissioning Activities. Number of Construction Phase Commissioning Progress meetings must be conducted for each systems category as specified in the following paragraphs. Meetings must be conducted by conference call.

a. Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category: Six meetings.

b. Plumbing Systems Category: Two meetings.

c. Utility Systems Category: No meetings.

d. Electrical Type I Systems Category: No meetings.

e. Electrical Type II Systems Category: Two meetings.

f. Building Envelope Systems, Components, and Assemblies Category: Two meetings.

Construction Phase Commissioning Progress meetings are prohibited from being combined with conducting Construction Phase Commissioning Coordination meeting, conducting Site Observations, or witnessing Functional Performance Testing.

3.2.6.2 Commissioning Specialists Responsibilities

Each Commissioning Specialist must, at a minimum, conduct meetings and prepare meeting minutes complete with Attendance Roster for systems categories assigned to them in this Section. Commissioning Specialists are prohibited from performing these responsibilities for systems categories assigned to other Commissioning Specialists.

3.2.6.3 Installing Contractors and Others Responsibilities

Installing Contractors must attend these meetings. The Contracting Officer's Technical Representative, a User Representative, and a Public Works Department Representative may attend these meetings.

3.2.7 Construction Phase Interim Commissioning Plan

3.2.7.1 General Requirements

The Construction Phase Interim Commissioning Plan must be prepared and must be an update to the Design Phase Commissioning Plan and contents must include, but not be limited to, contents specified in the following paragraphs.

a. All contents specified for the Design Phase Commissioning Plan.

b. Basis of Design.

c. Contact information for the entire Commissioning Team.

3.2.7.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, prepare and submit the **Construction Phase Interim Commissioning Plan** no later than 30 calendar days after the Construction Phase Commissioning Coordination meeting and no later than 14 calendar days prior to performing construction of the building envelope.

3.2.8 Construction Phase Final Commissioning Plan

3.2.8.1 General Requirements

The Construction Phase Final Commissioning Plan must be prepared and must be an update to the Construction Phase Interim Commissioning Plan and contents must include, but not be limited to, contents specified in the following paragraphs.

a. All contents specified for the Construction Phase Interim Commissioning Plan.

b. All Pre-Functional Checklists.

c. All approved final Functional Performance Test Checklists.

3.2.8.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Prepare and submit the **Construction Phase Final Commissioning Plan** no later than 30 calendar days prior to performing any Functional Performance Testing.

b. File one copy of **Approved Construction Phase Final Commissioning Plan** in the Sustainability eNotebook no later than 14 calendar days after receiving approval of the Construction Phase Final Commissioning Plan.

3.2.9 Construction Phase Issues And Resolution Log

3.2.9.1 General Requirements

The Construction Phase Issues and Resolution Log must be prepared and maintained to track all Commissioning Issues identified by any member of the Commissioning Team. The Construction Phase Issues and Resolution Log must be prepared in an electronic format that can be used throughout the Construction Phase such that it can be provided to the Government upon request. Construction Phase Issues and Resolution Log contents must include, but not be limited to, contents specified in the following paragraphs.

a. Project title and location.

b. Lead Commissioning Specialist's contact information.

c. Issue number.

d. Date issue was discovered.

e. Name of Commissioning Team member identifying the issue.

f. Commissioning Team member responsible for resolving the issue.

g. Current status.

h. Issue description.

i. Pictures of item if available and appropriate.

j. Effects of issue on project or building operation.

k. Possible cause of issue.

l. Proposed resolution.

m. Final resolution and final resolution date.

n. Approvals of issue resolution, including approver's name.

3.2.9.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must prepare and maintain the **Construction Phase Issues And Resolution Log** and must submit one electronic copy no later than seven calendar days after the addition of an issue or a change in status of an issue.

3.2.10 Pre-Functional Checklists

3.2.10.1 General Requirements

Pre-Functional Checklists must be prepared for all commissioned equipment, systems, and assemblies that are subject to functional performance testing and testing required according to UFGS 01 91 19 BUILDING ENCLOSURE COMMISSIONING. Pre-Functional Checklist contents must include, but not be limited to, contents for physical inspections that demonstrate construction, installation and start-up of equipment, systems, and assemblies is complete. Refer to item entitled "Pre-Functional Checklists" in item entitled "Inspections and Testing" for more information.

Download example Pre-Functional Checklists for Section 01 91 00.15 TOTAL BUILDING COMMISSIONING at the following location: http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphics-tables. Checklists must contain the same level of detail shown in examples, but are not required to match the format of examples.

3.2.10.2 Lead Commissioning Specialist Responsibilities

Lead Commissioning Specialist must provide blank Pre-Functional Checklists to Installing Contractors. Blank Pre-Functional Checklists are not required to be submitted to the Government.

3.2.10.3 Commissioning Specialists Responsibilities

Commissioning Specialists must prepare Pre-Functional Checklists for all equipment, systems, and assemblies listed under systems categories assigned to them in this Section that are subject to functional performance testing and testing required according to UFGS 01 91 19 BUILDING ENCLOSURE COMMISSIONING. Commissioning Specialists are prohibited from performing these responsibilities for equipment, systems, and assemblies listed under systems categories assigned to other Commissioning Specialists.

3.2.11 Functional Performance Test (FPT) Checklists

Functional Performance Test (FPT) Checklists must be prepared for all commissioned equipment, systems, and assemblies demonstrating performance is in accordance with Plans and Specifications as specified in the following paragraphs. A single final FPT Checklist must be prepared for each equipment piece, system, and assembly except that a single final FPT Checklist may be prepared for use with those that have identical features as modified in the following paragraphs. FPT Checklist contents must include, but not be limited to, step-by-step actions, expected results, and confirmation of compliance with required provisions of ASHRAE 90.1 - IP as modified in the following paragraphs. Refer to item entitled

"Construction Phase Functional Performance Testing" for more information.

3.2.11.1 Complex Systems Requirements

FPT Checklists must be prepared for all complex systems as defined in paragraph COMPLEX SYSTEMS. A single FPT Checklist must be prepared for each system except that a single FPT Checklist may be prepared for use with multiple systems that have identical control sequences such as unitary air-conditioners, packaged terminal air-conditioners, and heat pumps.

Contents must include, but not be limited to, contents specified in the following paragraphs and shown in example FPT Checklists for Section 01 91 00.15 TOTAL BUILDING COMMISSIONING available for download at the following location: http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphics-tables. FPT Checklists must contain the same level of detail specified below and as shown in examples, but are not required to match the format of examples.

a. Notable system features including information about such attributes as system sizing and controls to facilitate understanding of system operation.

b. Conclusions and recommendations based on control system feature, point-to-point, actuator, and system operation observations. Conclusions must clearly indicate if system does or does not perform in accordance with requirements of Plans and Specifications. Recommendation must clearly indicate that the system should or should not be accepted by the Government.

c. Test conditions including date, beginning and ending time, and beginning and ending outdoor air conditions.

d. Identification of the equipment involved in the test.

e. Attendees present throughout the entire system test.

f. Control system feature identification including control point description, embedded/visible type, adjustable/monitoring type, actual value, and setpoint value/alarm range.

g. Point-to-point observations including demonstrating system flow meters and sensors have been calibrated and are correctly displayed on the Operator workstation.

h. Actuator operation observations demonstrating actuator responses to commands from the control system.

i. Variable frequency drive observations demonstrating minimum safe motor speed.

j. System operation observations for system-based testing demonstrating each control sequence, operation mode, and alarm condition resulting from control setpoint manipulation. System operation observations must include, but not be limited to, observations specified in the following paragraphs.

(1) Introduction identifying testing methodology.

(2) As-found conditions prior to system manipulation.

(3) Clear list of test items (step numbers).

(4) Design control sequences or interlocks segmented by unique functions.

(5) Intended test procedures following each segmented sequence or interlock identifying the system manipulation required to initiate system response.

(6) Expected system responses.

(7) Space for comments for each test item.

(8) Pass or fail indication for each test.

Performance Verification Tests prepared by the Controls Contractor as specified in Section 23 09 00.00 22 INSTRUMENTATION AND CONTROL FOR HVAC are prohibited from fulfilling requirements of this Section.

3.2.11.2 Plumbing Systems Requirements

FPT Checklists must be prepared for all equipment, systems, and assemblies listed under item entitled "Plumbing Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED.

3.2.11.3 Electrical Type I Systems Requirements

FPT Checklists must not be prepared for equipment, systems, and assemblies listed under item entitled "Electrical Type I Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED.

3.2.11.4 Electrical Type II Systems Requirements

FPT Checklists must be prepared for all equipment, systems, and assemblies listed under item entitled "Electrical Type II Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED. FPT Checklists must be system-based and demonstrate end-objective performance in accordance with Plans and Specifications. FPT Checklists must not repeat fundamental performance testing such as resistance measurements required in other Sections.

3.2.11.5 Building Envelope Systems, Components, and Assemblies Requirements

FPT Checklists must not be prepared for equipment, systems, and assemblies listed under item entitled "Building Envelope Systems, Components, and Assemblies Category" in paragraph SYSTEMS TO BE COMMISSIONED.

3.2.11.6 Proposed FPT Checklist Meeting and Draft FPT Checklist Meeting

For all complex systems as defined in paragraph COMPLEX SYSTEMS, a Proposed FPT Checklist Meeting and a Draft FPT Checklist Meeting must be conducted for detailed discussions of procedures intended to demonstrate performance is in accordance with Plans and Specifications. Meetings must be conducted by conference call.

3.2.11.7 Lead Commissioning Specialist and Commissioning Specialists Responsibilities

For all equipment, systems, and assemblies other than complex systems as defined in paragraph COMPLEX SYSTEMS, the Lead and Commissioning Specialist must perform respective responsibilities specified in the following paragraphs.

a. The Lead Commissioning Specialist must submit **Final Functional Performance Test Checklists** for each systems category listed under paragraph SYSTEMS TO BE COMMISSIONED for which FPT checklists are required to be prepared. FPT checklists must be submitted as a single submittal for each systems category no later than 30 calendar days prior to testing of any system in the respective systems category.

b. Commissioning Specialists must prepare Final Functional Performance Test Checklists for equipment, systems, and assemblies listed under systems categories assigned to them in this Section for which FPT checklists are required to be prepared. Commissioning Specialists are prohibited from performing these responsibilities for equipment, systems, and assemblies listed under systems categories assigned to other Commissioning Specialists.

For all complex systems as defined in paragraph COMPLEX SYSTEMS, the Lead Commissioning Specialist and Commissioning Specialists must prepare and submit Final Functional Performance Test Checklists in the sequence specified in the following paragraphs. Commissioning Specialists must perform respective responsibilities for equipment, systems, and assemblies listed under systems categories assigned to them in this Section. Commissioning Specialists are prohibited from performing respective responsibilities for equipment, systems, and assemblies listed under systems categories assigned to other Commissioning Specialists.

a. Commissioning Specialists must prepare Proposed Functional Performance Test Checklists.

b. The Lead Commissioning Specialist must submit **Proposed Functional Performance Test Checklists** for all complex systems as a single submittal no later than 60 calendar days prior to testing of any complex system.

c. Commissioning Specialists must conduct the Proposed Functional Performance Test Checklist Meeting attended by the Contracting Officer's Technical Representative.

d. Commissioning Specialists must prepare Draft Functional Performance Test Checklists to incorporate input from the Contracting Officer's Technical Representative.

e. The Lead Commissioning Specialist must provide Draft Functional Performance Test Checklists to Installing Contractors and Equipment Suppliers no later than seven calendar days prior to the Draft Functional Performance Test Checklist Meeting.

f. Commissioning Specialists must conduct the Draft Functional Performance Test Checklist Meeting attended by Installing Contractors and Equipment Suppliers. The Contracting Officer's Technical Representative may attend this meeting.

g. Commissioning Specialists must prepare Final Functional Performance Test Checklists to incorporate input from Installing Contractors.

h. The Lead Commissioning Specialist must submit Final Functional Performance Test Checklists for all complex systems as a single submittal no later than seven calendar days after meeting to discuss Draft Functional Performance Test Checklists and no later than 30 calendar days prior to testing of any complex system.

3.2.11.8 Installing Contractors and Equipment Suppliers Responsibilities

Installing Contractors and Equipment Suppliers must attend Draft Functional Performance Test Checklist Meeting.

3.2.12 Construction Submittals

3.2.12.1 General Requirements

Construction Submittals must be reviewed for all commissioned equipment, systems, and assemblies to the extent necessary to verify that equipment, systems, and assemblies are in compliance with Commissioning Aspects of UFC's referenced by the Design-Build contract and Plans and Specifications as modified in this Section. One review for each commissioned equipment, system, and assembly must be performed coincident with Designers of Record and review must include, but not be limited to, review of shop drawings and equipment performance data. Review of resubmittals is prohibited.

Construction Submittals must be reviewed for all commissioned equipment, systems, and assemblies to the extent necessary to verify that equipment, systems, and assemblies are in compliance with Commissioning Aspects of UFC's referenced by the Design-Build contract, Owner's Project Requirements (OPR), Basis of Design (BOD), and Plans and Specifications as modified in this Section. One review for each commissioned equipment, system, and assembly must be performed coincident with Designers of Record and review must include, but not be limited to, review of shop drawings and equipment performance data. Review of resubmittals is prohibited.

The OPR and BOD are for reference only and do not constitute part of this contract.

3.2.12.2 Construction Submittal Review Reports

A Construction Submittal Review Report must be prepared for all commissioned equipment, systems, and assemblies and contents must include, but not be limited to, contents specified in the following paragraphs.

a. Project title, project number, and date of review.

b. Overview complete goals of the Commissioning-focused submittal review process.

c. Summary of deficiencies.

d. Ongoing record of all Construction Submittals received and reviewed, list of unresolved deficiencies, and record of communications made to resolve deficiencies.

e. Descriptive outline of reviewed construction submittals complete with the Installing Contractor's submittal designation.

f. Clear description of deficiencies complete with supporting documentation.

3.2.12.3 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist activities must include, but not be limited to, activities specified in the following paragraphs.

a. Provide list of shop drawings and equipment performance data that must be reviewed to Installing Contractors.

b. Prepare and provide Construction Submittal review comments to Designers of Record.

c. Prepare and submit **Construction Submittal Review Reports** no later than seven calendar days after completion of each Construction Submittal review.

3.2.12.4 Commissioning Specialists Responsibilities

Commissioning Specialists must perform reviews of Construction Submittals for equipment, systems, and assemblies listed under systems categories assigned to them in this Section. Commissioning Specialists are prohibited from performing these responsibilities for equipment, systems, and assemblies listed under systems categories assigned to other Commissioning Specialists.

3.2.12.5 Designers of Record Responsibilities

Designers of Record activities must include, but not be limited to, receiving and considering for incorporation comments listed in Construction Submittal Review Reports provided by the Lead Commissioning Specialist.

3.2.12.6 Installing Contractors Responsibilities

Installing Contractors must provide all requested Construction Submittals, BOD, and requested supplemental information to the Lead Commissioning Specialist.

3.2.13 Construction Phase Site Observations

3.2.13.1 General Requirements

Construction Phase Site Observations must be performed as specified in the following paragraphs to verify and document Commissioning Aspects of equipment, systems, and assemblies as specified in this Section. Two eight-hour Construction Phase Site Observations must be conducted for each systems category that is not specified in the following paragraphs. Specified number of observations are totals that include all commissioned buildings and all construction phases in this project.

Construction Phase Site Observations are prohibited from being combined with witnessing Functional Performance Testing, but may be combined with Pre-Functional Checklist Verification unless indicated otherwise. Purposes of Site Observations specified in the following paragraphs for each

systems category may be combined into a single Site Observation.

3.2.13.2 Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category

Site Observations must be performed for the purposes specified in the following paragraphs.

a. Two eight-hour Site Observations to identify issues that may result in unsuccessful functional performance testing and to verify and document Commissioning Aspects of commissioned equipment, systems, and assemblies listed under this systems category.

b. One eight-hour Site Observation to verify and document HVAC pipe pressure testing.

c. One eight-hour Site Observation to verify and document HVAC pump installation.

d. One eight-hour Site Observation to verify and document compliance with provisions of ASHRAE 90.1 - IP.

3.2.13.3 Plumbing Systems Category

Site Observations must be performed for the purposes specified in the following paragraphs.

a. One eight-hour Site Observation to identify issues that may result in unsuccessful functional performance testing and to verify and document Commissioning Aspects of commissioned equipment, systems, and assemblies listed under this systems category.

b. One eight-hour Site Observation to verify and document Plumbing pipe pressure testing.

c. One eight-hour Site Observation to verify and document Plumbing pump installation.

d. One eight-hour Site Observation to verify and document compliance with provisions of ASHRAE 90.1 - IP.

3.2.13.4 Utility Systems Category

Site Observations must be performed for the purposes specified in the following paragraphs.

a. No Site Observation dedicated to this systems category. Verification and documentation of Commissioning Aspects of commissioned equipment, systems, and assemblies listed under this systems category may be combined with Site Observations for other systems categories.

b. No Site Observation dedicated to this systems category to verify and document compliance with provisions of ASHRAE 90.1 - IP. Verification and documentation of compliance with provisions of ASHRAE 90.1 - IP of commissioned equipment, systems, and assemblies listed under this systems category may be combined with Site Observations for other systems categories.

3.2.13.5 Electrical Type I Systems Category

Site Observations must be performed for the purposes specified in the following paragraphs.

a. Two eight-hour Site Observations to verify and document Commissioning Aspects and to witness testing performed by independent testing organizations of commissioned equipment, systems, and assemblies listed under this systems category and listed by the Lead Commissioning Specialist to require on-site verification and documentation by Commissioning Specialists. Independent testing organizations typically use tests readily available from testing associations such as the InterNational Electrical Testing Association (NETA).

b. No Site Observation dedicated to this systems category to verify and document compliance with provisions of ASHRAE 90.1 - IP. Verification and documentation of compliance with provisions of ASHRAE 90.1 - IP of commissioned equipment, systems, and assemblies listed under this systems category may be combined with Site Observations for other systems categories.

3.2.13.6 Electrical Type II Systems Category

Site Observations must be performed for the purposes specified in the following paragraphs.

a. Two eight-hour Site Observations to identify issues that may result in unsuccessful functional performance testing and to verify and document Commissioning Aspects of commissioned equipment, systems, and assemblies listed under this systems category.

b. One eight-hour Site Observation to verify and document compliance with provisions of ASHRAE 90.1 - IP.

3.2.13.7 Building Envelope Systems, Components, and Assemblies Category

Site Observations must be performed for the purposes specified in the following paragraphs.

a. One eight-hour Site Observation to verify, document, and witness inspections, measurements, and testing of building envelope and roofing systems performed by independent testing agencies and specified in Section 07 27 10 BUILDING AIR BARRIER SYSTEM.

b. One eight-hour Site Observation to verify, document, and witness pressure testing, infrared thermography testing, and fog testing of building envelope and roofing systems performed by independent testing agencies and specified in Section 01 91 19 BUILDING ENCLOSURE COMMISSIONING.

c. Three eight-hour Site Observation to verify and document that continuous air barrier materials and assemblies are in compliance with requirements of ASHRAE 90.1 - IP while the continuous air barrier is still accessible for inspection and repair.

3.2.13.8 Summary Meetings

A Summary Meeting must be conducted at the conclusion of each Site

Observation for the purpose of discussing issues discovered during each Site Observation. Meeting must be conducted on-site with all attendees present.

3.2.13.9 Site Observation Reports

A Site Observation Report must be prepared for each Site Observation for the purpose of documenting issues discovered during each Site Observation.

Site Observation Reports for all equipment, systems, and assemblies listed under item entitled "Electrical Type I Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must include results of testing performed by independent testing organizations that were witnessed by Commissioning Specialists and test results that were not witnessed by Commissioning Specialists.

3.2.13.10 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must provide list of equipment, systems, and assemblies listed under item entitled "Electrical Type I Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED that require on-site verification and documentation by Commissioning Specialists to Installing Contractors.

The Lead Commissioning Specialist must submit **Construction Phase Site Observation Reports** complete with Summary Meeting Attendance Roster no later than seven calendar days after Site Observation.

3.2.13.11 Commissioning Specialists Responsibilities

Commissioning Specialist must perform responsibilities specified in the following paragraphs.

a. Each Commissioning Specialist must be responsible to perform Site Observations, conduct Summary Meetings, and prepare Construction Phase Site Observation Reports for equipment, systems, and assemblies listed under systems categories assigned to them in this Section. Commissioning Specialists are prohibited from performing these responsibilities for equipment, systems, and assemblies listed under systems categories assigned to other Commissioning Specialists.

3.2.13.12 Installing Contractors Responsibilities

Installing Contractors must provide Commissioning Specialists access to construction and systems for Site Observations and must attend Summary Meetings.

Installing Contractors must schedule testing to occur in the presence of Commissioning Specialists as specified in the following paragraphs.

a. All equipment, systems, and assemblies listed under item entitled "Electrical Type I Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED and listed by the Lead Commissioning Specialist to require on-site verification and documentation by Commissioning Specialists. Results of testing of equipment, systems, and assemblies listed under item entitled "Electrical Type I Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must be provided to the Lead Commissioning Specialist that were witnessed by Commissioning Specialists and that were not witnessed by Commissioning Specialists.

b. Pressure testing, infrared thermography testing, and fog testing specified in Section 01 91 19 BUILDING ENCLOSURE COMMISSIONING and inspections, measurements, and testing specified in Section 07 27 10 BUILDING AIR BARRIER SYSTEM for equipment, systems, and assemblies listed under item entitled "Building Envelope Systems, Components, and Assemblies Category" in paragraph SYSTEMS TO BE COMMISSIONED. Results of all tests, inspections, and measurements must be provided to the Lead Commissioning Specialist that were witnessed by Commissioning Specialists and that were not witnessed by Commissioning Specialists.

3.2.14 Pre-Functional Checks

Pre-Functional Checks must be performed prior to performing Functional Performance Testing of respective system and activities must include, but not be limited to, activities specified in the following paragraphs.

a. Perform Pre-Functional Checklist Verification.

3.2.14.1 Pre-Functional Checklist Verification

3.2.14.1.1 General Requirements

Pre-Functional Checklist Verification must be performed using Pre-Functional Checklists from the approved Construction Phase Final Commissioning Plan by conducting on-site spot-checks to verify accuracy after receipt of completed Pre-Functional Checklists from Installing Contractors. Verification may be combined with Construction Phase Site Observations.

3.2.14.1.2 Number of Trips

The number of trips to the site for the purpose of Pre-Functional Checklist Verification for each systems category must be up to that specified in the following paragraphs. It is encouraged that these trips be combined with Construction Phase Site Observations.

a. Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category: One eight-hour trips.

b. Plumbing Systems Category: No trips. Combine these activities with HVAC Category activities trip.

c. Utility Systems Category: No trip dedicated to this systems category. Verification of commissioned equipment, systems, and assemblies listed under this systems category may be combined with trips for other systems categories.

d. Electrical Type I Systems Category: No trips.

e. Electrical Type II Systems Category: One eight-hour trip.

f. Building Envelope Systems, Components, and Assemblies Category: One eight-hour trip.

3.2.14.1.3 Sample Strategy

20-Percent sample spot-check for all equipment, systems, and assemblies for which Pre-Functional Checklists have been completed. Sample spot-check

must include at least one complete item such as one complete unitary air-conditioner.

3.2.14.1.4 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must provide blank Pre-Functional Checklists to Installing Contractors.

The Lead Commissioning Specialist must submit all **completed Pre-Functional Checklists** and all associated equipment start-up reports for each systems category listed under paragraph SYSTEMS TO BE COMMISSIONED as a single submittal no later than seven calendar days after receipt of all completed checklists for equipment, systems, and assemblies listed under the respective systems category from Installing Contractors.

3.2.14.1.5 Commissioning Specialists Responsibilities

Commissioning Specialists must perform Pre-Functional Checklist Verifications and then must indicate acceptance of all Pre-Functional Checklist items for equipment, systems, and assemblies listed under systems categories assigned to them in this Section. Commissioning Specialists are prohibited from performing these responsibilities for equipment, systems, and assemblies listed under systems categories assigned to other Commissioning Specialists.

3.2.14.1.6 Installing Contractors Responsibilities

Installing Contractors must complete one Pre-Functional Checklist for each piece of equipment and system. Initial each Pre-Functional Checklist item for their area of responsibility indicating the item's construction, installation, and start-up as applicable has been verified to be complete and is ready for testing.

Installing Contractors must provide completed and initialed Pre-Functional Checklists and all associated equipment start-up reports to the Lead Commissioning Specialist as a single package for each systems category no later than seven calendar days after completion of inspection of all checklist items for each piece of equipment and system.

3.2.15 Certified Certificates of Readiness and Certificates of Readiness

3.2.15.1 General Requirements

A single Certified Certificate of Readiness must be prepared for each equipment, system, and assembly subject to Functional Performance Testing and testing required according to UFGS 01 91 19 BUILDING ENCLOSURE COMMISSIONING by reviewing, signing, and dating Certificates of Readiness to indicate each equipment, system, and assembly is complete and ready for testing. Testing of any equipment, system, or assembly is prohibited until after its Certified Certificate of Readiness has been submitted and approved. Government approval of Certified Certificates of Readiness does not constitute the Government's responsibility for equipment, systems, or assemblies being complete and ready for testing.

A single Certificate of Readiness must be prepared for each equipment, system, and assembly subject to Functional Performance Testing and testing required according to UFGS 01 91 19 BUILDING ENCLOSURE COMMISSIONING. Certificate of Readiness contents must include, but not be limited to, contents specified in the following paragraphs to the extent applicable to

the specific system being tested.

a. Cover sheet with spaces for signatures and dates by the Lead Commissioning Specialist and by Installing Contractors to indicate each system is complete and ready for testing.

b. Equipment and system start-up reports.

c. Control system start-up reports.

d. Diagnostic test reports.

e. Completed Pre-Functional Checklists.

3.2.15.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must sign, date, and submit **Certified Certificates of Readiness** for all equipment, systems, and assemblies listed under each systems category listed under paragraph SYSTEMS TO BE COMMISSIONED as a single submittal no later than 14 calendar days prior to testing of any equipment, system, or assembly listed under respective systems category.

3.2.15.3 Commissioning Specialists Responsibilities

Commissioning Specialists must perform reviews of Certificates of Readiness for accuracy to ensure equipment, systems, and assemblies are complete and ready for testing for equipment, systems, and assemblies listed under systems categories assigned to them in this Section. Commissioning Specialists are prohibited from performing these responsibilities for equipment, systems, and assemblies listed under systems categories assigned to other Commissioning Specialists.

3.2.15.4 Installing Contractors Responsibilities

Installing Contractors must prepare, sign, and date Certificates of Readiness indicating equipment, systems, and assemblies are complete and ready for testing. Certificates of Readiness for all equipment, systems, and assemblies listed under each systems category listed under paragraph SYSTEMS TO BE COMMISSIONED must be provided to the Lead Commissioning Specialist as a single package for each systems category.

3.2.16 Construction Phase Functional Performance Testing

3.2.16.1 General Requirements

Construction Phase Functional Performance Testing must be performed for all equipment, systems, and assemblies for which a Functional Performance Test (FPT) Checklist has been prepared. Testing must be performed using approved checklists and all required Commissioning Team participants must be present prior to start of testing. Testing must be aborted and rescheduled to occur at a later date if any Commissioning Team participant is not present or if deficiencies discovered during testing prevent successful completion. Testing of any equipment, system, and assembly is prohibited until after its Certified Certificate of Readiness has been submitted and approved.

All necessary materials and system modifications to simulate actual conditions as close as is practically possible must be provided. Complete

all testing by returning affected equipment, systems, and assemblies to pre-test conditions.

3.2.16.2 Complex Systems Requirements

Testing of complex systems as defined in paragraph COMPLEX SYSTEMS in paragraph SYSTEMS TO BE COMMISSIONED must be performed as specified in the following paragraphs.

3.2.16.2.1 Equipment Featuring On-Board Factory Packaged Controls

Testing of equipment featuring on-board factory packaged controls must include, but not be limited to, testing specified in the following paragraphs.

a. Equipment enabling and disabling.

b. Equipment standard and optional control points necessary to accomplish functionality whether or not control points are specified in Plans and Specifications.

c. Equipment standard and optional alarms critical to safe operation whether or not optional alarms are specified in Plans and Specifications.

d. All control points added by Controls Contractor in addition to on-board factory packaged controls whether or not control points are specified in Plans and Specifications.

3.2.16.2.2 Test Setup and Condition Simulation

Test setup must include all necessary materials and system modifications to simulate flows, pressures, temperatures, and other conditions necessary to perform testing according to specified conditions must be provided.

Condition simulation must be accomplished by temporarily changing control system setpoints. Condition simulation by over-writing control system inputs (actual) values is prohibited unless approved in advance of test by the Contracting Officer's Technical Representative.

3.2.16.2.3 Condition Simulation Methods

Condition simulation methods for equipment, systems, and assemblies listed under item entitled "Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED that are acceptable are specified in the following paragraphs.

a. When varying static pressures inside ductwork cannot be simulated within the duct, and where a sensor signals the controls system to initiate sequences at various duct static pressures, it is acceptable to simulate the various pressures with a Pneumatic Squeeze-Bulb Type Signaling Device with gauge temporarily attached to the sensing tube leading to the transmitter. It is not acceptable to reset the various setpoints, nor to simulate an electric analog signal unless approved as specified in the preceding paragraphs.

b. Dirty filter pressure drops can be simulated using sheets of cardboard at filter face.

c. Freeze-stat safeties can be simulated by packing portion of sensor with ice.

d. High outside air temperatures can be simulated with a hair blower.

e. High entering cooling coil temperatures can be used to simulate entering cooling coil conditions.

f. Do not use signal generators to simulate sensor signals unless approved by the Contracting Officer's Technical Representative, as noted above, for special cases.

g. Control setpoints can be altered. For example, to see the air conditioning compressor lockout work at an outside air temperature below lockout setpoint, when the outside air temperature is above lockout setpoint, temporarily change the lockout setpoint to be minus 0 degrees above the current outside air temperature. Caution: Setpoints are not to be raised or lowered to a point such that damage to the components, systems, or the building structure and/or contents will occur.

h. Test duct mounted smoke detectors in accordance with the manufacturer's recommendations. Perform testing with air system at minimum airflow condition in ductwork.

i. Test current sensing relays used for fan and pump status signals to control system to indicate unit failure and run status by resetting the setpoint on the relay to simulate a lost belt or unit failure while the unit is running. Confirm that the failure alarm was generated and received at the control system. After the test is performed, return the setpoint to its original setpoint or a setpoint as indicated by the Contracting Officer's Technical Representative.

3.2.16.3 Sample Strategy

3.2.16.3.1 General Requirements

100-Percent testing of all equipment, systems, and assemblies as modified in the following paragraphs. Sample strategy for testing less than 100-percent testing must be equally applied to each commissioned building in this project.

3.2.16.3.2 Complex Systems

Sample strategy for all complex systems as defined in paragraph COMPLEX SYSTEMS must be as specified in the following paragraphs.

a. 100-Percent testing for equipment, systems, and assemblies such as chilled water systems, HVAC heating hot water systems, renewable energy systems, building automation systems, energy management and control systems, aircraft pre-conditioned air systems, air handling unit systems including all associated fans except for remote exhaust air fans, dedicated outside air systems including all associated fans except for remote exhaust air fans, computer room air-conditioning units, whole-building energy monitoring, and whole-building water utility monitoring.

b. 20-Percent sample testing for equipment, systems, and assemblies with identical control sequences such as heat pumps, split system

air-conditioning units, and packaged terminal air-conditioner units. Sample must include at least one complete item such as one complete heat pump.

3.2.16.3.3 Plumbing Systems

Sample strategy for all equipment, systems, and assemblies listed under item entitled "Plumbing Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED except plumbing systems defined as complex systems in paragraph COMPLEX SYSTEMS must be as specified in the following paragraphs.

a. 100-Percent testing for equipment, systems, and assemblies such as domestic heating hot water systems, domestic solar heating hot water systems, service water pressure-booster pump systems, process water systems, natural gas systems, and irrigation systems.

b. 20-Percent sample testing for equipment, systems, and assemblies with identical features such as fixtures, semi-instantaneous water heaters, emergency eyewash stations, and vacuum systems. Sample must include at least one complete item such as one complete fixture.

3.2.16.3.4 Electrical Type II Systems

Sample strategy for all equipment, systems, and assemblies listed under item entitled "Electrical Type II Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED except electrical systems defined as complex systems in paragraph COMPLEX SYSTEMS must be as specified in the following paragraphs.

a. 100-Percent testing for equipment, systems, and assemblies such as frequency converters, emergency power off control systems, emergency response systems, electrical utility metering systems, and photovoltaic systems.

b. 20-Percent sample testing for equipment, systems, and assemblies with identical features such as audiovisual systems, automatic receptacles controls, communications systems, energy monitoring, lighting systems, lighting control devices, lighting control systems, and security systems. Sample must include at least one complete item such as lighting in one space.

3.2.16.4 Unsuccessful Testing and Re-Testing

3.2.16.4.1 Unsuccessful Testing of 100-Percent Sample

Testing must be failed for equipment or systems for which 100-percent sample size are tested if one or more of the test procedures results in discovery of a deficiency that cannot be resolved within five minutes during testing.

Re-testing must be witnessed to the extent necessary to confirm that deficiencies have been corrected without negatively impacting the performance of the rest of the system.

3.2.16.4.2 Unsuccessful Testing of Less than 100-Percent Sample

Testing must be failed for equipment or systems for which less than 100-percent sample size are tested if one or more of the test procedures results in discovery of a deficiency, regardless of whether the deficiency is corrected during the sample test.

a. Re-testing must be witnessed of only items which experienced initial failures if the failure rate is 5-percent or less, meaning that 5-percent or less of the equipment or systems had at least one deficiency.

b. Re-testing must be witnessed of items which experienced initial failures to the extent necessary to confirm that the deficiencies have been corrected if the failure rate is higher than 5-percent, meaning that more than 5-percent of equipment or systems tested had at least one deficiency. In addition, testing of another random sample must be witnessed for the same size as the initial sample for the first time. If the second random sample set has any failures, those failed items must be retested and all remaining equipment, systems, and assemblies must be tested to complete 100-percent testing of that system type.

3.2.16.5 Re-Testing Costs

Re-testing costs may be withheld by the Contracting Officer from payments to Installing Contractors. These costs may include salary, travel costs, and per diem associated with re-testing for the Lead Commissioning Specialist, Commissioning Specialists, and Government personnel.

3.2.16.6 Commissioning Team Participants

Participants of Functional Performance Testing must include, but not be limited to, participants specified in the following paragraphs. The Contracting Officer's Technical Representative, Public Works Department Division (PWD) Representatives, and Using Agent's Representatives (Users) may, but are not required to, participate in any testing.

3.2.16.6.1 Heating, Ventilation, and Air-Conditioning (HVAC) Systems

Commissioning Team members participating in Functional Performance Testing of equipment, systems, and assemblies listed under item entitled "Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must include, but not be limited to, participants specified in the following paragraphs.

a. Mechanical Commissioning Specialist (CxM).

b. Installing Contractors’ Quality Control Personnel (CQC).

c. Installing Contractors’ Controls Commissioning Representative (CC).

d. Installing Contractors’ TAB Commissioning Representative (TAB).

e. Installing Contractors’ Mechanical Commissioning Representative (MC).

f. Equipment Supplier (ES).

3.2.16.6.2 Plumbing Systems

Commissioning Team members participating in Functional Performance Testing of equipment, systems, and assemblies listed under item entitled "Plumbing Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must include, but not be limited to, participants specified in the following paragraphs.

a. Mechanical Commissioning Specialist (CxM).

b. Installing Contractors’ Quality Control Personnel (CQC).

c. Installing Contractors’ Controls Commissioning Representative (CC).

d. Installing Contractors’ Plumbing Commissioning Representative (PC).

e. Equipment Supplier (ES).

3.2.16.6.3 Utility Systems

Commissioning Team members participating in Functional Performance Testing of equipment, systems, and assemblies listed under item entitled "Utility Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must include, but not be limited to, participants specified in the following paragraphs.

a. Mechanical Commissioning Specialist (CxM).

b. Installing Contractors’ Quality Control Personnel (CQC).

c. Installing Contractors’ Controls Commissioning Representative (CC).

d. Installing Contractors’ TAB Commissioning Representative (TAB).

e. Installing Contractors’ Mechanical Commissioning Representative (MC).

f. Installing Contractors’ Plumbing Commissioning Representative (PC).

g. Installing Contractors’ Electrical Commissioning Representative (EC).

h. Equipment Supplier (ES).

3.2.16.6.4 Electrical Type II Systems

Commissioning Team members participating in Functional Performance Testing of equipment, systems, and assemblies listed under item entitled "Electrical Type II Systems Category" in paragraph SYSTEMS TO BE COMMISSIONED must include, but not be limited to, participants specified in the following paragraphs.

a. Electrical Commissioning Specialist (CxE).

b. Installing Contractors’ Quality Control Personnel (CQC).

c. Installing Contractors’ Electrical Commissioning Representative (EC).

d. Equipment Supplier (ES).

3.2.16.7 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Contact Contracting Officer's Technical Representative no later than 30 calendar days prior to performing Testing to select which systems must be tested for samples of less than 100-percent.

b. Coordinate logistics with Installing Contractors.

c. Submit **completed Final Functional Performance Test Checklists** for each systems category listed under paragraph SYSTEMS TO BE COMMISSIONED as a single submittal no later than 14 calendar days after successful testing of all systems listed under the respective systems category.

3.2.16.8 Commissioning Specialists Responsibilities

Commissioning Specialists must witness, re-witness, and document all testing for equipment, systems, and assemblies listed under systems categories assigned to them in this Section. Commissioning Specialists are prohibited from performing these responsibilities for equipment, systems, and assemblies listed under systems categories assigned to other Commissioning Specialists.

3.2.16.9 Installing Contractors Responsibilities

Installing Contractors must provide all necessary materials and perform all aspects of testing including modifications to simulate actual conditions for all equipment, systems, and assemblies related to their contract.

3.2.16.10 Equipment Suppliers Responsibilities

Equipment Suppliers must perform all aspects of testing of equipment featuring on-board factory packaged controls provided as part of their contract. Refer to paragraph COMPLEX SYSTEMS for definition of equipment featuring on-board factory packaged controls.

3.2.16.11 Installing Contractors and Equipment Supplier Coordination

Installing Contractors and Equipment Suppliers must simultaneously perform all aspects of testing of equipment featuring on-board factory packaged controls provided as part of their contract.

3.2.17 Systems Manuals

3.2.17.1 General Requirements

Systems Manuals must be prepared for all commissioned equipment, systems, and assemblies and contents must include, but not be limited to, contents specified in the following paragraphs.

a. Executive summary containing overview of design, construction, and operation requirements.

b. Certificate of Occupancy.

c. Approved Construction Phase Commissioning Plan.

d. Approved Construction Phase Issues and Resolution Log.

e. Identification of unresolved deficiencies complete with resolution plan if not included in approved Final Commissioning Report.

f. Final Owner's Project Requirements.

g. Final Basis of Design.

h. Record documents including as-built Plans and Specifications and

approved Construction Submittals.

i. Operation and Maintenance Manuals.

j. Maintenance procedures, checklists, and records.

k. Recommended maintenance schedules when schedules are not provided in Operation and Maintenance manuals.

l. Ongoing Commissioning operational and maintenance record keeping procedures to monitor equipment, systems, and assemblies performance.

m. Building and equipment operation schedules.

n. Equipment and system limitations.

o. Emergency procedures.

p. Recommended schedule for sensor and actuator calibration.

q. Recommended re-testing schedule.

r. Blank copy of all approved final Functional Performance Test Checklists.

s. Completed Functional Performance Test Checklists if not included in approved Final Commissioning Report.

t. Equipment warranty information.

u. Installing Contractors and Equipment Suppliers contact information.

v. Training Plans if not included in approved Final Commissioning Report, training materials, and completed Training Attendance Rosters if not included in approved Final Commissioning Report.

w. Commissioning Design Review Reports if not included in approved Final Commissioning Report.

x. Construction Submittal Review Reports.

y. Approved Final Commissioning Report.

z. All Commissioning reports that are not specified in the preceding paragraphs and are not specified to be included in the approved Final Commissioning Report.

Systems Manual contents for all complex systems as defined in paragraph COMPLEX SYSTEMS, in addition to contents specified in the preceding paragraphs, must include, but not be limited to, contents specified in the following paragraphs.

a. As-built system single line diagrams.

b. As-built sequences of operation and controls drawings.

c. As-built control system setpoints and operating ranges.

3.2.17.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, provide all review comments to the Installing Contractors for all equipment, systems, and assemblies listed under each systems category as a single package no later than 45 calendar days prior to first training event for any equipment, system, or assembly in respective systems category. Review comments are not required to be submitted to the Government.

3.2.17.3 Commissioning Specialist Responsibilities

Commissioning Specialists must, at a minimum, review and prepare review comments for all Systems Manuals. Commissioning Specialists are prohibited from performing these responsibilities for equipment, systems, and assemblies listed under systems categories assigned to other Commissioning Specialists.

3.2.17.4 Installing Contractors Responsibilities

Installing Contractors must, at a minimum, perform activities specified in the following paragraphs.

a. Prepare and provide all Systems Manuals to the Lead Commissioning Specialist for all equipment, systems, and assemblies listed under each systems category as a single package no later than 60 calendar days prior to first training event for any equipment, system, or assembly in respective systems category.

b. Incorporate all review comments.

3.2.18 Training

3.2.18.1 Training Plans

Training Plans must be prepared for all commissioned equipment, systems, and assemblies and contents must include, but not be limited to, contents specified in the following paragraphs.

a. List of those who should receive training by position or name.

b. List of systems that require training organized by Specification Section.

c. Outline of training topics that addresses design, construction, operation, and maintenance.

d. Learning objectives and training delivery methods.

e. Planned location of the training sessions (classroom, on-site, and off-site).

f. Minimum duration of each training session.

g. Training materials requirements to be used during the instructional process.

h. Training report, records, and recording requirements.

i. Instructor qualifications.

j. Instructor name and contact information.

k. Criteria for determining whether provided training is acceptable.

l. Blank Training Attendance Rosters.

3.2.18.2 Training

Training must be performed in accordance with Training Plans and in accordance with requirements specified in other Sections.

3.2.18.3 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, provide all review comments to the Installing Contractors for all equipment, systems, and assemblies listed under each systems category as a single package no later than 45 calendar days prior to first training event for any equipment, system, or assembly in respective systems category. Review comments are not required to be submitted to the Government.

3.2.18.4 Commissioning Specialist Responsibilities

Commissioning Specialists must, at a minimum, review and prepare review comments for all Training Plans. Commissioning Specialists are prohibited from performing these responsibilities for equipment, systems, and assemblies listed under systems categories assigned to other Commissioning Specialists.

3.2.18.5 Installing Contractors Responsibilities

Installing Contractors must, at a minimum, perform activities specified in the following paragraphs.

a. Prepare and provide all Training Plans to the Lead Commissioning Specialist for all equipment, systems, and assemblies listed under each systems category as a single package no later than 60 calendar days prior to first training event for any equipment, system, or assembly in respective systems category.

b. Incorporate all review comments.

c. Perform training as specified in the preceding paragraphs.

d. Require all training attendees to sign Training Attendance Rosters.

e. Provide all Approved Training Plans and Completed Training Attendance Rosters to the Lead Commissioning Specialist for all equipment, systems, and assemblies listed under each systems category as a single package no later than 30 calendar days after the last training event for all equipment, systems, and assemblies in respective systems category.

3.2.19 Final Commissioning Report

3.2.19.1 General Requirements

The Final Commissioning Report must be prepared and contents must include, but not be limited to, contents specified in the following paragraphs.

a. Executive summary describing the overall Commissioning Process.

b. Results of the Commissioning Process.

c. Issues And Resolution Log.

d. Commissioning Design Review Reports.

e. Approved Construction Phase Final Commissioning Plan.

f. Approved Pre-Final Test and Balance Reports.

g. Completed Pre-Functional Checklists.

h. Completed Functional Performance Test Checklists.

i. Approved Training Plans.

j. Completed Training Attendance Rosters.

k. Indication that equipment, systems, and assemblies meet requirements of the Owner's Project Requirements, Plans and Specifications, and provisions of ASHRAE 90.1 - IP.

l. Indication of plan for completion of any deferred trainings.

m. Identification of all deficiencies complete with corrective actions taken.

n. Identification of all repairs, replacements, and calibrations.

o. Identification of unresolved deficiencies complete with resolution plan and responsible Commissioning Team member.

p. List and plan for completion of any testing that must be performed during the Post-Construction (Warranty) Phase.

3.2.19.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Prepare and submit the **Final Commissioning Report** no later than 30 calendar days after Beneficial Occupancy.

b. File one copy of **Approved Final Commissioning Report** in the Sustainability eNotebook no later than 14 calendar days after receiving approval of the Final Commissioning Report.

3.3 POST-CONSTRUCTION (WARRANTY) PHASE

3.3.1 Post-Construction Phase ASHRAE Standard 90.1 Commissioning Compliance

3.3.1.1 General Requirements

Activities must include, but not be limited to, Post-Construction Phase Commissioning Activities referred to as "Building Systems Verification and Testing" and "Building Commissioning" in ASHRAE 90.1 - IP as modified in

this Section, Post-Construction Phase Commissioning Activities listed in references contained in ASHRAE 90.1 - IP as modified in this Section, and Post-Construction Phase Commissioning Activities specified in this Section.

3.3.1.2 Lead Commissioning Specialist and Commissioning Specialists Responsibilities

The Lead Commissioning Specialist and Commissioning Specialists must, at a minimum, perform all activities specified under item entitled "Post-Construction Phase ASHRAE Standard 90.1 Commissioning Compliance."

3.3.2 Post-Construction Phase Sustainability Third Party Certification (TPC) Commissioning Compliance

3.3.2.1 General Requirements

Activities must include, but not be limited to, Post-Construction Phase Commissioning Activities listed in the reference for pursuing Sustainability TPC, GBI DOD GP Compliance, as modified in this Section, Post-Construction Phase Commissioning Activities listed in all of its references as modified in this Section, and Post-Construction Phase Commissioning Activities specified in this Section.

3.3.2.2 Lead Commissioning Specialist and Commissioning Specialists Responsibilities

The Lead Commissioning Specialist and Commissioning Specialists must, at a minimum, perform activities specified in the following paragraphs.

a. The Lead Commissioning Specialist must submit all Post-Construction Phase documentation of Commissioning Activities directly to the Suitability TPC organization as modified in this Section.

b. The Lead Commissioning Specialist and Commissioning Specialists must perform all activities specified under item entitled "Post-Construction Phase Sustainability Third Party Certification (TPC)."

3.3.3 Post-Construction Phase Issues And Resolution Log

3.3.3.1 General Requirements

The Post-Construction Phase Issues and Resolution Log must be prepared and maintained to track all Commissioning Issues identified by any member of the Commissioning Team. The Post-Construction Phase Issues and Resolution Log must be prepared in an electronic format that can be used throughout the Post-Construction Phase such that it can be provided to the Government upon request. Post-Construction Phase Issues and Resolution Log contents must include, but not be limited to, contents specified in the following paragraphs.

a. Project title and location.

b. Lead Commissioning Specialist's contact information.

c. Issue number.

d. Date issue was discovered.

e. Name of Commissioning Team member identifying the issue.

f. Commissioning Team member responsible for resolving the issue.

g. Current status.

h. Issue description.

i. Pictures of item if available and appropriate.

j. Effects of issue on project or building operation.

k. Possible cause of issue.

l. Proposed resolution.

m. Final resolution and final resolution date.

n. Approvals of issue resolution, including approver's name.

3.3.3.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must prepare and maintain the **Post Construction Phase Issues And Resolution Log** and must submit one electronic copy no later than 14 calendar days after completion of any Post-Construction Phase Commissioning Activity.

3.3.4 Post-Construction Phase Site Observations

3.3.4.1 General Requirements

Post-Construction Phase Site Observations must be performed for each systems category specified in the following item entitled "Number of Trips" between eight and 10 months after Beneficial Occupancy to verify and document that all commissioned equipment, systems, and assemblies are operating in accordance with the Owner's Project Requirements.

Post-Construction Phase Site Observations are prohibited from being combined with witnessing Post-Construction Phase Functional Performance Testing.

3.3.4.2 Number of Trips

The Number of Post-Construction Phase Site Observations inclusive of all commissioned buildings in this project must be as follows

a. Heating, Ventilation, and Air-Conditioning (HVAC) Systems Category: One eight-hour trip.

b. Plumbing Systems Category: One eight-hour trip.

c. Utility Systems Category: No trips.

d. Electrical Type I Systems Category: No trips.

e. Electrical Type II Systems Category: One eight-hour trip.

f. Building Envelope Systems, Components, and Assemblies Category: One eight-hour trip.

3.3.4.3 Site Observation Reports

Site Observation Reports must be prepared for each Site Observation for the purpose of documenting issues discovered during Site Observation.

3.3.4.4 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Contact Contracting Officer's Technical Representative no later than 30 calendar days prior to performing Site Observation to schedule attendance of Operations and Maintenance staff and occupants and to make provisions for access to all commissioned equipment, systems, and assemblies.

b. Submit **Post-Construction Phase Site Observation Reports** no later than 14 calendar days after Site Observation.

3.3.4.5 Commissioning Specialists Responsibilities

Commissioning Specialists must, at a minimum, perform activities specified in the following paragraphs for equipment, systems, and assemblies listed under systems categories assigned to them in this Section. Commissioning Specialists are prohibited from performing these responsibilities for equipment, systems, and assemblies listed under systems categories assigned to other Commissioning Specialists.

a. Interview Operations and Maintenance staff.

b. Interview occupants.

c. Determine status of unresolved Commissioning Issues.

d. Compare current operations to operations identified throughout the Commissioning Process.

e. Prepare Post-Construction Phase Site Observation Reports.

3.3.5 Certified Certificates of Readiness and Certificates of Readiness

Certified Certificates of Readiness and Certificates of Readiness are not required for any Post-Construction Phase activity.

3.3.6 Post-Construction Phase Functional Performance Testing

3.3.6.1 General Requirements

Post-Construction Phase Functional Performance Testing must be performed for all commissioned equipment, systems, and assemblies that could not be fully or successfully tested during the Construction Phase. Testing must be performed using approved checklists and all required Commissioning Team participants must be present prior to start of testing. Testing must be aborted and rescheduled to occur at a later date if any Commissioning Team participant is not present or if deficiencies discovered during testing prevent successful completion.

Post-Construction Phase Functional Performance Testing requirements and

activities must include, but not be limited to, requirements and activities specified for Construction Phase Functional Performance Testing as modified in paragraphs under paragraph POST-CONSTRUCTION (WARRANTY) PHASE.

3.3.6.2 Commissioning Team Participants

Participants of Functional Performance Testing must include, but not be limited to, participants specified in the following paragraphs. The Contracting Officer's Technical Representative, Public Works Department Division (PWD) Representatives, and Using Agent's Representatives (Users) may, but are not required to, participate in any testing.

a. Lead Commissioning Specialist.

b. Commissioning Specialists.

c. Installing Contractors.

d. Equipment Suppliers.

3.3.6.3 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, perform activities specified in the following paragraphs.

a. Contact Contracting Officer's Technical Representative no later than 30 calendar days prior to witnessing Post-Construction Phase Functional Performance Testing to make provisions for access to all commissioned equipment, systems, and assemblies.

b. Coordinate logistics with Installing Contractors.

c. Submit completed Final Functional Performance Test Checklists for each systems category listed under paragraph SYSTEMS TO BE COMMISSIONED as a single submittal no later than 14 calendar days after successful testing of all systems listed under the respective systems category.

3.3.7 Updated Systems Manuals

3.3.7.1 General Requirements

Updated Systems Manuals must be prepared and must be an update to Systems Manuals prepared during the Construction Phase and contents must include, but not be limited to, changes resulting from Post-Construction Phase Commissioning Activities.

3.3.7.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, provide all review comments to the Installing Contractors as a single package 45 calendar days after Post-Construction Phase Site Observations or no later than 45 calendar days after Post-Construction Phase Functional Performance Testing, whichever occurs last. Review comments are not required to be submitted to the Government.

3.3.7.3 Commissioning Specialist Responsibilities

Commissioning Specialists must, at a minimum, review and prepare review

comments for all Updated Systems Manuals. Commissioning Specialists are prohibited from performing these responsibilities for equipment, systems, and assemblies listed under systems categories assigned to other Commissioning Specialists.

3.3.7.4 Installing Contractors Responsibilities

Installing Contractors must, at a minimum, perform activities specified in the following paragraphs.

a. Prepare and provide all Updated Systems Manuals to the Lead Commissioning Specialist as a single package no later than 30 calendar days after Post-Construction Phase Site Observations or no later than 30 calendar days after Post-Construction Phase Functional Performance Testing, whichever occurs last.

b. Incorporate all review comments.

3.3.8 Updated Final Commissioning Report

3.3.8.1 General Requirements

The Updated Final Commissioning Report must be prepared and must be an update to the Final Commissioning Report prepared during the Construction Phase and contents must include, but not be limited to, changes resulting from Post-Construction Phase Commissioning Activities.

3.3.8.2 Lead Commissioning Specialist Responsibilities

The Lead Commissioning Specialist must, at a minimum, prepare and submit the **Updated Final Commissioning Report** no later than 30 calendar days after completion of all Functional Performance Testing.

File one copy of **Approved Updated Final Commissioning Report** in the Sustainability eNotebook no later than 14 calendar days after receiving approval of the Updated Final Commissioning Report.

-- End of Section --

SECTION 01 91 19

BUILDING ENCLOSURE COMMISSIONING
05/2023

PART 1 GENERAL

1.1 SUMMARY

Use this Section in conjunction with UFGS 01 91 00.15 22 TOTAL BUILDING COMMISSIONING. Building Enclosure Commissioning (BECx) is an essential part of overall Building Commissioning. The final BECx report is to be included as a part of the Cx Firm's submittal of the Final Commissioning Report as defined in 01 91 00.15 22 TOTAL BUILDING COMMISSIONING. This Section covers Building Envelope Commissioning for all six surfaces (4 walls, roof, and floor, for a rectangular shaped zone) of a building. Additional Quality Control and testing requirements for specific components of the building envelope are described in the Division 03 thru 08 UFGS Sections of the project specifications.

1.2 REFERENCES

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

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

AAMA 501.2	(2015) Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls and Sloped Glazing Systems

AMERICAN SOCIETY FOR NONDESTRUCTIVE TESTING (ASNT)

ANSI/ASNT CP-105	(2020) ASNT Standard Topical Outlines for Qualification of Nondestructive Testing Personnel
ANSI/ASNT CP-189	(2020) ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel
ASNT SNT-TC-1A	(2020) Recommended Practice for Personnel Qualification and Certification in Nondestructive Testing

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 90.1 - IP	(2019; Errata 1 2019; Errata 2-5 2020; Addenda BY-CP 2020; Addenda AF-DB 2020; Addenda A-G 2020; Addenda F-Y 2021; Errata 6-8 2021; Interpretation 1-4 2020; Interpretation 5-8 2021 Addenda AS-AQ2022) Energy Standard for Buildings Except Low-Rise Residential Buildings

ASHRAE 202	(2024) Commissioning Process for Buildings and Systems

ASTM INTERNATIONAL (ASTM)

ASTM C1193	(2016) Standard Guide for Use of Joint Sealants
ASTM D4541	(2022) Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
ASTM E779	(2019) Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
ASTM E783	(2002; R 2018) Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
ASTM E1105	(2015; R 2023) Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference
ASTM E1186	(2022) Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems
ASTM E1258	(1988; R 2018) Standard Test Method for Airflow Calibration of Fan Pressurization Devices
ASTM E1827	(2022) Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door
ASTM E2813	(2018) Standard Practice for Building Enclosure Commissioning
ASTM E2947	(2021) Standard Guide for Building Enclosure Commissioning

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 6781	(1983) Thermal Insulation - Qualitative Detection of Thermal Irregularities in Building Envelopes - Infrared Method
ISO 6781-2	(2010) Performance of Buildings - Detection of Heat, Air, and Moisture Irregularities in Buildings by Infrared Methods - Part2: Equipment Requirements
ISO 6781-3	(2015) Performance of Buildings - Detection of Heat, Air, and Moisture Irregularities in Buildings by Infrared Methods - Part 3: Qualifications of

Equipment Operators, Data Analysts, and Report Writers

1.3 DEFINITIONS

The definitions included here are specific to this Section. Refer to UFGS 01 91 00.15 22 TOTAL BUILDING COMMISSIONING for definitions that apply to both Sections. The following terms as they apply to this section:

1.3.1 Air Barrier Envelope

The components of building assemblies(roofs, walls, and floors) that separate the inside air from the outside air. The combination of air barrier assemblies and air barrier components, connected by air barrier accessories are designed to provide a continuous barrier to the movement of air through an environmental separator. A single building may have more than one air barrier envelope enclosing multiple environmentally separated zones. The air barrier surface includes the top, bottom, and sides of the envelope. The term "air barrier envelope" is also known as "air barrier system" or simply "air barrier".

1.3.2 Air Leakage Rate

A measurement of air infiltration or exfiltration through the building envelope over time. The air leakage rate is the rate of air flow across the air barrier per unit surface area of the envelope at a defined differential pressure.

1.3.3 Basis of Design (BoD)

A document developed by the design team which includes technical concepts, assumptions, calculations, decisions, and product selections to support the Owner's Project Requirements (OPR).

1.3.4 Bias Pressure

Also known as zero flow pressure, baseline pressure, offset pressure or background pressure. With the envelope not artificially pressurized, bias is the differential pressure that always exists between the envelope that has been prepared (sealed) for the pressure test and the outdoors. Bias pressure is made up of two components, fixed static offset (usually due to stack effect or the HVAC system) and fluctuating pressure (usually due to wind or a moving elevator). Because of pressure fluctuations many bias pressure readings are recorded and averaged for use in the calculations.

1.3.5 Blower Door

Commonly used term for an apparatus used to pressurize and depressurize the space within the building envelope and quantify air leakage through the envelope. The blower door typically includes a door fan and an air resistant fabric or a series of hard panels that extends to cover and seal the door opening between the fan shroud and door frame. The door fan is a calibrated fan capable of measuring air flow and is usually placed in the opening of an exterior door. With the air barrier otherwise sealed, air produced by the door fan pressurizes or de-pressurizes the envelope, depending on the fan's orientation.

1.3.6 Building Envelope (or enclosure)

The materials, components, systems, and assemblies intended to provide an environmental separator between the interior and exterior or between interior spaces with different environment requirements. "Enclosure" is used interchangeably with "envelope".

1.3.7 Building Envelope Commissioning (BECx)

Technical service provided on behalf of the Government to provide a quality-focused process for enhancing the performance of the building en velope by validating the design phase and verifying during the construction phase that the performance of the building enclosure materials components, assemblies, and systems are designed and installed to meet the Owner's Project Requirements (OPR).

1.3.8 Building Envelope Commissioning Specialist (CxB)

An entity that functions as part of the overall Commissioning Team and is responsible for validating the design phase and verifying during the construction phase that the performance of the building enclosure materials, components, assemblies, and systems are designed and installed to meet the Owner's Project Requirements (OPR).

1.3.9 Construction Phase

The period of a project following the award of construction Contract to project completion.

1.3.10 Design Phase

The period of the project delivery process when a design supporting the Owner's Project Requirements is developed and translated into Contract Documents.

1.3.11 Environmental Separator

The parts of a building that separate the controlled interior environment from the uncontrolled exterior environment, or that separate spaces within a building that have dissimilar environments. The term "environmental separator" is also known as the "control layer".

1.3.12 Functional Performance Test (FPT)

A systematic process to verify that controls and other elements of the building project are capable of and configured to operate or perform as required. FPT's are written and observed by the Technical Cx Specialist and performed by the Verification and Testing Provider. Tests not written by the Technical Cx Specialists, but required and defined throughout this specification manual are not described as FPTs in UFGS 01 91 00.15 22 TOTAL BUILDING COMMISSIONING.

1.3.13 Owner's Project Requirements (OPR)

A document or set of documents that detail the stakeholders' requirements for the project and the expectations for how it will be used and operated.

1.3.14 Pressure Test

A generic term for a test in which the building envelope or zone is either pressurized or de-pressurized with respect to the outdoors or other building zones.

1.3.15 Negative Pressure Test (Depressurization Test)

A test wherein air inside the envelope is drawn to the outdoors. This places the envelope at a lower (negative) pressure with respect to the outdoors.

1.3.16 Positive Pressure Test (Pressurization Test)

A test wherein outdoor air is pushed into the envelope. This air movement places the envelope at a higher (positive) pressure with respect to the outdoors.

1.3.17 Verification & Testing (V&T) Provider

An entity who completes the activities needed to implement verification and testing of the building's materials, components, assemblies, and systems, including testing described throughout this specification manual and functional performance testing (FPT) activities to verify that elements of the building project meet contract document requirements.

1.4 COMMUNICATION WITH THE GOVERNMENT COMMISSIONING PROVIDER

For communication responsibilities, see Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING.

1.5 COMMUNICATION WITH GOVERNMENT'S Cx and ACCEPTANCE TESTING REPRESENTATIVES

The QC Manager must communicate directly with the Government Acceptance Testing Representatives, the government's Lead Cx Specialist (CxC), and Contracting Officer's Representative regarding Government acceptance testing activities. Inform the government's Lead Cx Specialist (CxC) and the Contracting Officer's Representative when systems are ready for testing to be witnessed by the government's Cx Specialists and Government Acceptance Testing Representatives, and allow access to the construction site and system(s) to be tested.

1.6 ENCLOSURE COMPONENTS TO BE COMMISSIONED

1.6.1 Verification of the Installation of the Continuous Air Barrier

a. Conduct periodic field inspection of the continuous air barrier materials and assemblies, including all penetrations through the six sides of the air barrier, during construction while the continuous air barrier is still accessible for inspection and repair (after installation of all penetrations and wall cladding anchoring devices and before the installation of interior finishes) to verify and document compliance with the requirements. Conduct inspections at initial installation of each building envelope component and at in-progress construction intervals as stated in Part 3 section titled BUILDING ENVELOPE INSPECTION AND TESTING.

b. Conduct Performance Verification Testing of the entire building

envelope (systems, components, and assemblies) for air tightness in accordance with Part 3 section titled BUILDING ENVELOPE AIR TIGHTNESS REQUIREMENT.

1.6.2 Inspection of Fenestration and Doors

a. Fenestration and Doors must be labeled and inspected to verify compliance with Building Envelope energy requirements, including applicable U-factors, Solar Heat Gain Coefficient (SHGC), Visible Transmittance (VT), and air leakage rates.

b. Inspect doors and windows for coordination with the insulating plane of the wall, continuity with the air/weather barrier, and flashing.

c. Inspect operation of doors, closers, and operating mechanisms for conformance with manufacturer's instructions.

d. Inspect seals and gaskets for fenestration and doors (including loading dock, sectional, and coiling doors) for proper installation and to verify that seals are in good condition and comply with ASHRAE 90.1 - IP maximum allowed leakage rates.

1.6.3 Inspection of Opaque Roof, Walls, and Floors

Opaque roof, above-grade and below-grade walls, and floors, must be subject to the following inspections during construction:

a. Use of ASHRAE 90.1 - IP-compliant materials and assemblies.

b. Insulation material meets design specifications and is continuous.

1.6.4 Fenestration Inspections

Conduct inspections of the following fenestration-related items during construction:

a. Skylights size and location in relation to the designed primary sidelighted area and secondary sidelighted area below.

b. Roof monitor size and location in relation to the designed primary sidelighted area and secondary sidelighted area below.

c. Dynamic glazing compliance with SHGC and U-factors, and testing of the operation for conformance with the manufacturer's instructions.

d. Permanent fenestration projections installation and performance in accordance with ASHRAE 90.1 - IP requirements and the Contract documents.

1.6.5 Additional Building Enclosure Tests

Conduct the following building enclosure tests on mock-ups or early in the installation of the related building components:

a. Adhesion tests on liquid-applied and adhered waterproofing and air/weather barrier in accordance with ASTM D4541.

b. Air leakage testing of fenestration in accordance with ASTM E783.

c. Small scale bubble tests of waterproofing and air/weather barriers in accordance with ASTM E1186.

d. Water penetration tests of fenestration in accordance with ASTM E1105.

e. Water penetration tests of installed storefronts, curtainwall, and sloped glazing systems in accordance with AAMA 501.2.

f. Adhesion and cohesion tests of sealants in accordance with ASTM C1193.

1.7 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Building Enclosure Testing Work Plan; G

PRELIMINARY BECx PLAN; G

SD-03 Product Data

Thermal Imaging Camera; G

Test Equipment; G

SD-05 Design Data

Envelope Surface Area Calculations; G

SD-06 Test Reports

Completed Building Envelope Inspection Checklists; G

Pressure Test Procedures; G

Air Leakage Test Report; G

Diagnostic Test Report; G

FINAL BECx PLAN; G

FINAL BECx REPORT; G

SD-07 Certificates

Pressure Test Agency

Thermographer Qualifications

Certificate of Readiness

SD-10 Operation and Maintenance Data

Training; G

1.8 BUILDING ENCLOSURE TESTING WORK PLAN

For each building enclosure test to be performed, submit the following not later than 120 calendar days after Contract award, but before start of testing work, steps to be taken by the lead test technician to accomplish the required testing.

a. Memorandum of test procedure.

(1) Proposed dates for conducting the tests.

(2) Submit detailed test procedures prior to the test. Provide a plan view showing proposed locations (personnel doors or other similar openings) to install equipment (such as blower doors or flexible ducts for trailer-mounted fans, if used).

(3) Submit detailed requirements for access to or pressurization of adjacent, occupied buildings or zones. Provide a plan view showing proposed locations (personnel doors or other similar openings) to install equipment (such as blower doors or flexible ducts for trailer-mounted fans, if used).

b. Test equipment to be used.

c. Scaffolding, scissor lifts, power, electrical extension cords, duct tape, plastic sheeting and other Contractor's support equipment required to perform all tests.

d. Other Contractor's support personnel who will be on site for testing.

1.9 ACCESSIBILITY REQUIREMENTS

Air barrier components, insulation, fenestration, and doors for commissioned systems must be made accessible for inspections. Contractor must make necessary modifications at Contractor's own expense if systems and enclosures are not accessible for inspections and testing. Assist commissioning team in testing and inspections by removing equipment covers, opening access panels, and other required activities that assist with visual oversight. Furnish ladders, flashlights, meters, gauges, or other inspection equipment as necessary.

1.10 SCHEDULING

Notify the Government's Lead Cx Specialist and the Contracting Officer a minimum 14 calendar days in advance of site visits and inspections by the roof system manufacturer technical representative for coordination with CxB and the Government Acceptance Testing Representative.

1.11 COORDINATION

Refer to Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING for requirements pertaining to coordination during the commissioning process. Coordinate with the Commissioning Provider in accordance with Section 01 91 00.15 22 and in accordance with the Commissioning Plan to schedule inspections as required to support the commissioning process. Furnish additional information requested by the Commissioning Provider.

Coordinate scheduling of air barrier inspections and air barrier pressure testing with the commissioning team. Upload plans, reports, notes, and other documentation to the Commissioning Provider's web-based commissioning software, or as specified in the commissioning plan, as it is completed.

1.12 QUALITY CONTROL

1.12.1 Modification of References

Perform all pressure and diagnostic tests according to the referenced publications listed in paragraph REFERENCES and as modified by this section. Consider the advisory or recommended provisions, of the referred references, as mandatory.

1.12.2 Qualifications

1.12.2.1 Pressure Test Agency

Submit, no later than 15 calendar days after Contract award, information certifying that the pressure test agency is not affiliated with any other company participating in work on this Contract. The work of the test agency is limited to pressure testing the building envelope, performing a thermography test and fog test, and investigating, through various methods, the location of air leaks through the air barrier. See Part 3 paragraph PRESSURE TEST AGENCY for additional requirements. For thermographer qualifications, see paragraph THERMOGRAPHER QUALIFICATIONS.

Use the sample TEST AGENCY QUALIFICATIONS SHEET form (Appendix C), to submit the following information.

a. Verification of 2 years of experience as an agency in pressure testing commercial or industrial buildings.

b. List of at least ten commercial/industrial facilities with building envelopes that the agency has tested within the past 2 years. Include building name, address, and name of prime construction Contractor and Contractor's point-of-contact information.

c. Confirmation of 2 years of commercial and or industrial building pressure test experience for the lead pressure test technician and the thermographer in using the specified ASTM E779 or ASTM E1827 testing standard. References from five Contracting Officers for facilities where the lead test technician has supervised commercial and or industrial building pressure tests in the last 2 years.

d. Verification that the lead pressure test technician has been employed by a building pressure testing agency in the capacity of a lead pressure test technician for not less than 1 year.

1.12.2.2 Thermographer Qualifications

To perform an infrared diagnostic evaluation, use a lead thermographer who has at least an active Level II Certification that is based on the requirements in ANSI/ASNT CP-105 or ANSI/ASNT CP-189 and is in accordance with ASNT SNT-TC-1A. The course of study is to be specifically focused on infrared thermography for building science. The thermographer must have at least two years of building science thermography experience in IR testing commercial or industrial buildings. The thermographer must also

have experience in building envelopes and building science in order to make effective recommendations to the Contractor should the envelope require additional sealing. Thermographic equipment operators, data analysts and report writers must comply with the requirements of ISO 6781-3. Submit the thermographer's certificate for approval. Submit a list of at least ten commercial/industrial buildings on which the thermographer has performed IR thermography in the past two years. The thermographer is to have a current active certification. Submit certification at least 60 days prior to thermography testing.

1.12.3 Test Reports

No later than 14 days after completion of the pressure test, submit electronic copies of an organized report. The report is to contain a table of contents, an executive summary, an introduction, a results section and a discussion of the results. Submit the air leakage test report as described in paragraph AIR LEAKAGE TEST REPORT. Submit a diagnostic test report as described in paragraph LOCATING LEAKS BY DIAGNOSTIC TESTING. The diagnostic test report is to include the Thermographic Investigation Report and the Fog Test Report.

Submit field data and completed report forms found in the appendices. Use the sample forms, Test Agency Qualification Sheet, Air Leakage Test Form and Air Leakage Test Results Form to summarize the tests for the appropriate building envelope. Submit both electronically populated and field hand filled-in forms.

Report Data. Include in the report the following information for all tests:

a. Date of issue

b. Project title and number

c. Name, address, and telephone number of testing agency

d. Dates and locations of samples and tests or inspections

e. Names of individuals making the inspection or test

f. Designation of the work and test method

g. Identification of product and specification section

h. Complete inspection or test data

i. Test results and an interpretation of test results

j. Comments or professional opinion on whether inspected or tested work complies with Contract document requirements

k. Recommendations on retesting

1.13 CLIMATE CONDITIONS SUITABLE FOR A PRESSURE TEST

As the test date approaches, monitor the weather forecast for the test site. Avoid testing on days forecast to experience high winds, rain, or snow. Monitor weather forecasts prior to shipping pressure test equipment to the site. Based on current and forecast weather conditions, the

Contracting Officer's representative is to grant final approval for testing to occur.

1.13.1 Rain

For safety reasons, avoid testing during rain or if rain is anticipated during testing. If pneumatic hoses are installed and exposed to rain inspect the hose to ensure rainwater has not migrated into the hose ends. Orient all exposed hose ends to keep them out of water puddles. Success in temporarily sealing outdoor ventilation components such as louvers and exhaust fans may also be compromised by rain. Don't seal roof-mounted ventilation components during times of potential lightning.

1.13.2 Wind

Because wind can skew pressure test results, test only on days and at times when winds are anticipated to be the calmest. Avoid pressure testing during gusty or high wind conditions. Avoid installing test fans on the windward side of the building if wind gusts during the test are anticipated to be greater than 10 miles per hour.

1.14 CERTIFICATE OF READINESS

Prior to scheduling the Commissioning Tests as required by this Section, submit Certificate of Readiness documentation in accordance with Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING for each enclosure-related system, certifying that inspections have been completed, open issues have been resolved, and the system is ready for the Commissioning Tests. Documentation would include Building Envelope Inspection Checklists as required within this Section, as well as any inspections or test reports required within each enclosure-related technical specification section. Additional Quality Control and testing requirements for specific components of the building enclosure are described in the Division 03 thru 08 UFGS Sections of the project specifications.

Submit the Certificate of Readiness for each system 20 working days prior to Commissioning Tests of that system. Do not schedule Commissioning Tests for a system until the Certificate of Readiness is approved by the Government. Do not schedule air tightness testing of the building envelope system until Certificates of Readiness and supporting documentation for enclosure-related systems have been submitted, reviewed and approved by the Government.

PART 2 PRODUCTS

2.1 TEST EQUIPMENT

Provide all equipment required to perform testing for the systems and components to be commissioned. Provide all testing equipment of sufficient quality and accuracy to test and measure system performance with the tolerances specified. Provide a sufficient quantity of two-way radios for each subcontractor.

Submit a signed and dated list of instruments to be used for testing, their application, manufacture, model, serial number, range of operation accuracy, and date of most recent calibration. Calibration data applicable to fan systems must be in accordance with ASTM E1258. Also list special equipment and proprietary tools specific to a piece of equipment required for testing.

2.2 PRESSURE TEST EQUIPMENT

Depending on site conditions and size of the envelope, the test may be conducted using blower door equipment and/or trailer-mounted fans. The testing agency is to supply sufficient quantity of blower equipment that will produce a minimum of 75 Pa differential pressure between the envelope and outdoors using the test methods described herein. Supplying additional blower test equipment to provide additional airflow capacity or to act as a backup is highly recommended.

2.2.1 Blower Door Fans and Trailer Mounted Fans

Each air flow measuring system including blower door fans and trailer mounted fans are to be calibrated within the last 5 years. Calibrated blower door fans and trailer mounted fans must measure accurately to within plus or minus 5 percent of the flow reading. Blower door equipment and trailer mounted fans are to be specifically designed to pressurize building envelopes. Each set of blower door equipment is to include fan(s), digital gage(s), door frame, door fabric or hard panels.

2.2.2 Digital Gages as Test Instruments

Use only digital gages as measuring instruments in the pressure test; analog gages are not acceptable. The gauges must be accurate to within 1.0 percent of the pressure reading or 0.15 Pa, whichever is greater. Each gage is to have been calibrated within two years of the test. The calibration is to be checked against a National Institute of Standards and Technology (NIST, formerly National Bureau of Standards) traceable standard.

2.3 THERMAL IMAGING CAMERA REQUIREMENTS

The thermal imaging camera used in the thermography test must have a thermal sensitivity (Noise Equivalent Temperature Difference.) of +/- 0.18 degrees F at 86 degrees F or less. Ensure the camera's operating spectral range falls between 2 and 15 micrometers. Ensure the camera's IR image viewing screen resolution measures at least 320x240 pixels. Ensure the camera has a means of recording thermal images seen on the camera viewing screen. The camera is to display output as individual still frame images that also can be downloaded and inserted into an electronic Thermographic Investigation Report. All thermographic equipment must comply with the requirements of ISO 6781-2. Submit camera make and model, and catalog information that defines the camera thermal sensitivity for approval.

PART 3 EXECUTION

Coordinate with the COMMISSIONING TEAM and perform all Contractor and Equipment supplier activities and responsiblities defined in Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING and building envelope related specifications to accomplish building envelope commissioning in accordance with ASHRAE 202 and ASTM E2947 in addition to the requirements herein. Follow ASTM E2947 except where it references ASTM E2813. All verification and testing work shall be documented and provided to the government's Cx Firm in sufficient detail to demonstrate compliance of the building envelope with the design intent as defined in the Contract documents.

3.1 MEETINGS

Attend all meetings in accordance with Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING.

Provide timely updates on construction schedule changes so Commissioning Provider has scheduling information needed to execute commissioning process efficiently. Notify Contracting Officer of anticipated construction delays to commissioning activities not yet performed or not yet scheduled.

3.2 DESIGN PHASE COMMISSIONING COORDINATION MEETING

Participate in a design phase commissioning coordination meeting led by the CxC prior to the 35 percent design submittal for systems to be commissioned. The purpose of the meeting is to discuss the commissioning process, including project Contract requirements, lines of communication, roles and responsibilities, schedules, documentation requirements, and to develop a Preliminary BECx Plan.

The Quality Control team, Designer of Record, and the Government Acceptance Testing Representatives and other Government team members must attend this meeting. Invite the User and a Public Works Division Representative to attend this meeting. Meeting must be conducted by conference call.

3.3 PRELIMINARY BECx PLAN

Submit the Preliminary BECx Plan no later than 14 calendar days after the Design Phase Commissioning Coordination Meeting. Submit the Preliminary BECx Plan for inclusion in the Design Phase Commissioning Plan as identified in Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING. Coordinate the development of this plan with the commissioning plans required in Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING. Outline the commissioning process, commissioning team members and responsibilities, lines of communication, inspections, and documentation requirements for BECx. Identify the Commissioning Standards chosen for the project. Establish appropriate and quantifiable enclosure related performance metrics, test standards, and test methodology in accordance with referenced standards for inclusion in the Contract documents. Provide a list of team members for systems to be commissioned with contact information, a list of tests as required to complete the scope of all commissioning and a copy of the project schedule as required by Section 01 32 17.00 20 COST-LOADED NETWORK ANALYSIS SCHEDULE for inclusion in the Preliminary BECx Plan.

The Preliminary BECx Plan must include, at a minimum, the following:

1. Required performance of commissioned equipment, systems, and assemblies, and results of all building envelope verification and testing.

2. Summary of compliance of the building and its components, assemblies, controls, and systems with requirements.

3. Issues and resolution logs, including itemization of deficiencies found during verification, testing, and commissioning that have not been corrected at the time of report preparation.

4. Deferred tests that cannot be performed at the time of report preparation.

5. Documentation of the training of operation personnel and building occupants on commissioned systems, and a plan for the completion of any deferred trainings not completed at the time of report preparation.

6. A plan for the completion of commissioning and training, including climatic and other conditions required for performance of the deferred tests.

3.4 DESIGN REVIEWS

The Government's CxB is responsible for reviewing the design and preparing a Design Review Report as identified in Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING. The Contracting Officer, the CxC, the CxB, and the Designers of Record for the associated systems must meet, discuss, and resolve any outstanding items contained in the report no later than 14 calendar days after submission of the report. This meeting is intended to be incorporated into each project review meeting. The CxB must verify that the review comments have been adequately addressed in subsequent design submittals.

Give particular attention to the continuity of the air barrier, vapor and moisture control within enclosure assembly, acoustic control of the enclosure assemblies to meet required Outdoor Indoor Transmission Class (OITC) values, flashing, thermal bridges, and resistance to water penetration or ponding.

3.5 FINAL BECx PLAN

Submit the Final BECx Plan directly to the Government's Lead Cx Specialist (CxC) for inclusion in the Cx Firm's submittal, the Construction Phase Interim Commissioning Plan, as identified in Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING. Outline the commissioning process, commissioning team members and responsibilities, lines of communication, and documentation requirements for BECx. Identify the Commissioning Standards chosen for the project. Identify enclosure related inspections, performance metrics, test standards, and test methodologies in accordance with referenced standards for inclusion in the commissioning process.

Provide a list of names and contact information for quality control personnel, designers of record, and installing contractors for building envelope systems to be commissioned, a list of tests as required by this Section as well as 07 27 10 BUILDING AIR BARRIER SYSTEM, and a copy of the project schedule as required by Section 01 32 17.00 20 COST-LOADED NETWORK ANALYSIS SCHEDULE for inclusion in the Final BECx Plan. Final BECx plan must be included in the Cx Firm's submittal of the Construction Phase Interim Commissioning Plan, and must be updated and included with the Cx Firm's submittal of the Construction Phase Final Commissioning Plan as identified in Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING.

3.6 CONSTRUCTION SUBMITTAL REVIEWS

Coordinate construction submittal document reviews for commissioned systems and assemblies with the CxC and CxB. The commissioning submittal review does not replace the designer of record (DoR) or Government submittal review, in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES.

The CxB is responsible for identifying construction submittals to be provided by the Contractor for the commissioned systems and coordinating with the CxC. The CxB is responsible for evaluating construction submittals related to BECx for compliance with the Contract documents. The DoR must consider the CxB's comments and provide direction to the Contractor as necessary. Provide a copy of final DoR submittal reviews with comment responses to the CxB. Include a copy of the submittal document review transmittal and response in the Commissioning Report.

3.7 TEMPLATE BUILDING ENVELOPE INSPECTION CHECKLISTS

Use the Template Building Envelope Inspection Checklists prepared by the CxC to verify the building materials and construction maintain the required air tightness of the building envelope system.

The Building Envelope Compliance Documentation Form from ASHRAE 90.1 - IP User's Manual may be used as an example. The submitted checklist is not required to match the format of the form; however, the checklist must contain the same level of detail as shown on the mandatory provisions of the sample form.

3.8 BUILDING ENVELOPE INSPECTION AND TESTING

Demonstrate that all system components have been installed, that each building enclosure component operates, and that the systems operate and perform in accordance with Contract documents. Provide all materials, services, equipment, and labor required to perform the Building Envelope Inspections.

Coordinate site observation activities with the government's CxC and participate in periodic building envelope inspections with the technical Building Envelope commissioning specialists (CxB) using the approved Building Envelope Inspection Checklists to observe and document construction of the building envelope in-progress. Coordinate inspection requirements with Section 07 27 10 BUILDING AIR BARRIER SYSTEM and other Division 7 Specifications. Complete the checklists and indicate inspection and validation of each Building Envelope Inspection Checklist item by initials at the time they are inspected. Notify the Lead Commissioning Specialist (CxC) and Contracting Officer at least 21 calendar days before checklist items are concealed to ensure inspection items can be observed before construction progresses. Submit the initialed and Completed Building Envelope Inspection Checklists no later than 14 calendar days after completion of inspection of all checklist items. Notify the CxC at least 21 calendar days prior to the building envelope pressure tests and diagnostic tests specified in this Section.

3.8.1 Additional Building Enclosure Testing

a. Conduct adhesion tests on liquid-applied and adhered waterproofing and air/weather barrier in accordance with ASTM D4541.

b. Conduct air leakage testing of fenestration in accordance with ASTM E783.

c. Conduct small scale bubble tests of waterproofing and air/weather barriers in accordance with ASTM E1186.

d. Conduct water penetration tests of fenestration in accordance with

ASTM E1105.

e. Conduct water penetration tests of installed storefronts, curtainwall, and sloped glazing systems in accordance with AAMA 501.2.

f. Conduct adhesion and cohesion tests of sealants in accordance with ASTM C1193.

3.9 BUILDING ENCLOSURE AIR BARRIER PRESSURE TESTING

3.9.1 Pressure Test Agency

Employ an independent agency to conduct the pressure test on the building envelope in accordance with ASTM E779 and this specification section. The test agency is to be an independent third-party subcontractor, not an affiliated or subsidiary of the prime Contractor, subcontractors, or A/E firm. The agency is to be regularly engaged in pressure testing of commercial/industrial building envelopes. If using blower door or trailer-mounted fans, the lead test technician must have at least two years of experience in using such equipment in building envelope pressurization tests. Formal training using pressure test equipment is highly recommended. Technicians using the building's air handling system for pressure testing are to have tested at least five commercial/industrial buildings within the past two years with each building having over 50,000 square feet of floor area. Submit the name, address, and floor areas of each of these five buildings for approval.

3.9.1.1 Field Work

The lead pressure test technician and thermographer are to be present at the project site while testing is performed and is to be responsible for conducting, supervising, and managing of their respective test work. Management includes health and safety of test agency employees.

3.9.1.2 Reporting Work

The lead pressure test technician is to prepare, sign, and date the test agenda, equipment list, and submit a certified Air Leakage Test Report. The thermographer is to prepare, sign, and date the test agenda, equipment list, and submit a certified Thermographic Investigation Report. The Contractor is to prepare a final report that identifies improvements that were made to the envelope to reduce air leaks , mitigate thermal bridging, eliminate moisture migration, repair insulation voids discovered during diagnostic tests. The Verification & Testing (V&T) providers must certify completion of required verification and testing and include a plan for the completion of any deferred testing, including climatic and other conditions required for performance of the deferred tests; include the results of the testing and verification activities in the completed verification and testing documentation. Jointly submit all reports.

3.9.2 Envelope Surface Area Calculation

The architectural air barrier boundary includes the floor, walls, and ceiling. After construction of the air barrier envelope is complete, field measure the envelope to ensure the physical measurements match the design drawings and the air barrier envelope surface area calculations are generated. If the calculation result is not within 10 percent of the defined air barrier boundary calculation result as indicated, submit the envelope surface area calculation and results for review. If the air

barrier was defined during design but the air barrier envelope surface area was not calculated, calculate it during construction and submit the envelope surface area calculations and result for review.

3.9.3 Preparing The Building Envelope For The Pressure Test

3.9.3.1 Testing During Construction

The pressure test cannot be conducted until all components of the air barrier system have been installed. After all sealing as described herein has been completed, inspect the envelope to ensure it has been adequately prepared. During the pressure test, stop all ongoing construction within and neighboring the envelope which may impact the test or the air barrier integrity. The pressure test may be conducted before finishes that are not part of the air barrier envelope have been installed. For example, if suspended ceiling tile, interior gypsum board or cladding systems are not part of the air barrier the test can be conducted before they are installed. Recommend testing prior to installing the finished ceilings and interior wall finishes within the envelope and immediately surrounding it. The absence of finishes allows for inspection and diagnostic testing of the roof/wall interface and for implementation of repairs to the air barrier, if necessary to comply with the maximum allowed leakage.

3.9.3.2 Sealing the Air Barrier Envelope

The Contractor is to seal all penetrations through the air barrier. Unavoidable penetrations due to electrical boxes or conduit, plumbing, and other assemblies that are not air-tight are to be made so by sealing the assembly and the interface between the assembly and the air barrier or by extending the air barrier over the assembly. Support the air barrier 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. Durably construct the air barrier to last the anticipated service life of the assembly and to withstand the maximum positive and negative pressures placed on it during pressure testing. Do not install lighting fixtures that are equipped with ventilation holes through the air barrier.

3.9.3.3 Sealing Plumbing

Prime all plumbing traps located within the envelope full of water.

3.9.3.4 Close and Lock Doors

Close and lock all doors and windows in the envelope perimeter. For doors not equipped with latching hardware, temporarily secure them in the closed position. Secure the doors in such a way that they remain fully closed even when the maximum anticipated differential air pressure produced during the test acts on them. Provide signage stating not to open the door and the time and duration of the test.

3.9.3.5 Hold Excluded Building Areas at the Outdoor Pressure Level

Keep building areas immediately surrounding but excluded from the test envelope at the outdoor pressure level during the pressure test. Maintain these areas at the outdoor pressure level by propping exterior doors open, opening windows and de-energizing all air moving devices in or serving these areas.

3.9.3.6 Maintain an Even Pressure within the Envelope

Ensure the pressure differences within the envelope are minimized by opening all internal air pathways including propping open all interior doors. Distribute test fans throughout the envelope as necessary to ensure the internal pressures are uniform (within 10 percent of the average differential pressure). Ideally, do not install suspended ceilings until after all pressure tests have been completed. If, however the envelope includes finished suspended ceiling spaces, temporarily remove approximately 5 percent of all ceiling tiles or a minimum of 1 tile from each isolated suspended ceiling space, whichever comprises the greatest surface area. Temporarily remove additional ceiling tiles during testing to allow for inspection and diagnostic testing of the ceiling/wall interface. An alternative to removing ceiling tiles is to measure the differential pressure between each isolated suspended ceiling space and the outdoors when the area below the suspended ceiling is maintained at a differential pressure of 75 Pa with respect to the outdoors. If the suspended ceiling differential pressure measurement is within ten percent of the 75 Pa pressure below the suspended ceiling no ceiling tiles need to be removed.

3.9.3.7 Maintain Access to Mechanical and Electrical Rooms

Maintain access to mechanical rooms and electrical rooms associated with the envelope to allow for de-energizing ventilation equipment and resetting circuit breakers tripped by blower door equipment, if used.

3.9.3.8 Minimize Potential for Blowing Dust and Debris

Because high velocity air will be blown into and out of the envelope during the test, debris, including dust and litter, may become airborne. Airborne debris may become trapped or entangled in test equipment, thereby skewing test results. Ensure areas within and surrounding the envelope are free of dust, litter and construction materials that are easily airborne. If pressurizing existing, occupied areas, provide adequate notice to building occupants of blowing dust and debris, and general disruption of normal activities during the test.

3.9.3.9 De-energize Air Moving Devices

De-energize all air moving devices serving the envelope to keep air within the envelope as still as reasonably achievable. De-energize all fans that deliver air to, exhaust air from, or recirculate air within the envelope. Also, de-energize all fans serving areas adjacent to but excluded from the envelope.

3.9.3.10 Installing Blower Door Equipment in a Door Opening

Where blower door fans are used, before installing blower door equipment, select a door opening that does not restrict air flow into and out of the envelope and has at least 5 feet clear distance in front of and behind the door opening. Disconnect the door actuator and secure the door open to prevent it from being drawn into the fan-by-fan pressure. Avoid installing blower door equipment on the windward side of the building.

3.9.4 Building Envelope Air Tightness Requirement

For each building envelope, perform the Architectural Only test and if noted below, the Architectural Plus HVAC System test. The purpose of the

pressure (air leakage) test is to determine final compliance with the airtightness requirement by demonstrating the performance of the continuous air barrier. An effective air barrier envelope minimizes infiltration and exfiltration through unintended air paths (leaks). The tests may be performed in any desired order.

3.9.4.1 Architectural Only Test

The test envelope is the architectural air barrier boundary as defined on the Contract drawings. This boundary includes connecting walls, roof and floor which comprise a complete, whole, and continuous three-dimensional envelope. Perform both a positive pressure test and a negative pressure test on this envelope, unless otherwise directed.

3.9.4.1.1 Test Goal

Input data from the test into the Air Leakage Rate by Fan Pressurization spreadsheet as described in paragraph CALCULATION PROGRAM via the Air Leakage Test Form. Compare output from the spreadsheet against the maximum allowable leakage defined in Section 07 27 10 BUILDING AIR BARRIER SYSTEM. The envelope passes the test if the leakage rate, as calculated using the spreadsheet, is equal to or lower than the Architectural Only leakage rate goal.

3.9.4.1.2 Preparing the Envelope for the Pressure Test - Seal All Openings through the Air Barrier

Temporarily close all perimeter windows, roof hatches and doors in the envelope perimeter except for those doors that are to remain open to accommodate blower door or trailer mounted fan test equipment installation. Seal, or isolate all other intentional openings, pathways, and fenestrations through the architectural envelope prior to pressure testing. Follow the Recommended Test Envelope Conditions identified in ASTM E1827, Table 1, for the Closed Envelope condition. These openings may include boiler flues, fuel-burning water heater flues, fuel-burning kitchen equipment, clothes dryer vents, fireplaces, wall or ceiling grilles, diffusers, and other similar openings. Before sealing flues, close their associated fuel valves and verify the associated pilot lights are extinguished. Prime all plumbing traps located within the envelope full of water. In lieu of applying tape or plastic, typical temporary sealing materials include tape and sheet plastic or a self-adhesive grille wrap. Use and apply tape and plastic in a manner that does not deface or remove paint or mar the finish of permanent surfaces. Be especially aware of residue that remains from tape applied to stainless steel surfaces such as kitchen hoods or rollup doors. For painted surfaces, use tape types that do not remove finish paint when the tape is removed. If paint is removed from the finished surface, repaint to match existing surfaces. Secure dampers closed either manually or by using the building's HVAC system controls. Use the table below for further guidance in building preparation.

Building Component	Envelope Condition
Air handling units, duct fans	As found (open) or temporarily sealed as necessary
Clothes dryer	Off

Building Component	Envelope Condition
Clothes dryer vents	Temporarily sealed
Dampers - intake, exhaust	Physically closed or closed using control power or temporarily sealed
Diffusers, registers, grilles within the envelope	Temporarily sealed
Doors, personnel type, at the envelope perimeter	Secured closed
Doors, personnel type, within the envelope	Secured (propped) open
Doors, roll-up type, at the envelope perimeter	Closed (no additional sealing)
Exhaust hoods	Closed* and temporarily sealed
Fireplace hearth	Temporarily sealed *
Kitchen hoods	Temporarily sealed *
Pilot light and associated fuel valve	Extinguished and closed, respectively
Vented combustion appliance	Temporarily sealed *
Vented combustion appliance exhaust flue	Off
Windows	Secured closed
* If the building component has an associated manual or automatic damper, consider securing the damper closed in lieu of temporarily sealing.	

3.9.4.2 Architectural Plus HVAC System Test

This test envelope includes the architectural air barrier boundary as defined on the Contract drawings plus all HVAC supply, return and exhaust systems that penetrate and terminate within said architectural air barrier boundary and that extends outward from said boundary. All associated ductwork, intake and exhaust dampers, and air moving devices, including air handling units and fans, are included in this test envelope even if they are physically located outside of the architectural air barrier boundary. The boundary extends to and includes the low leakage intake and exhaust dampers. Perform both a positive pressure test and a negative pressure test on this envelope, unless otherwise indicated.

3.9.4.2.1 Test Goal

Data from the test is to be input into the Air Leakage Rate by Fan Pressurization spreadsheet as described in paragraph CALCULATION PROGRAM via the Air Leakage Test Form. If both positive and negative pressure tests were performed, both data sets are to be input in the spreadsheet. Compare output from the spreadsheet against the leakage rate goal. The envelope passes the test if the leakage rate, as calculated using the spreadsheet, is equal to or lower than the Architectural Plus HVAC System

leakage rate goal.

3.9.4.2.2 Preparing the Building for the Pressure Test

In preparation for this test, de-energize all air moving devices within this envelope by putting their controls in the Unoccupied mode. This allows the building's HVAC controls to close all associated motorized intake, exhaust, and relief dampers. Make no other changes to the HVAC systems. Temporarily sealing diffusers, grilles, registers, kitchen hoods, exhaust hoods, fans, air handling units and all other HVAC system elements with tape or plastic sheeting or any other means is not allowed. If the envelope includes a fireplace hearth do not seal it with tape and plastic. Use the table below for further guidance in building preparation.

Building Component	Envelope Condition
Air handling units, duct fans	As found (open)
Clothes dryer	Off
Clothes dryer vents	As found (no preparation)
Dampers - intake, exhaust	As found (no preparation)
Diffusers, registers, grilles within the envelope	As found (open)
Doors, personnel type, at the envelope perimeter	Secured closed
Doors, personnel type, within the envelope	Secured (propped) open
Doors, roll-up type, at the envelope perimeter	Closed (no preparation)
Exhaust hoods	Closed
Fireplace hearth	As found (open)
Kitchen hoods	As found (open)
Pilot light and associated fuel valve	Extinguished and closed, respectively
Vented combustion appliance	Off
Vented combustion appliance exhaust flue	As found (open)
Windows	Secured closed

3.9.5 Conducting The Pressure Test

Notify the Contracting Officer at least ten(10) working days before conducting the pressure tests to provide the Government the opportunity to witness the tests and to monitor weather forecasts for conditions favorable for testing. Do not pressure test until verifying that the continuous air barrier is in place and installed without failures in

accordance with installation instructions. During the pressure test periodically inspect temporarily sealed items to ensure they are still sealed. Seals on temporarily sealed items tend to release more readily at higher pressures. Test data obtained after temporarily sealed items become unsealed cannot be used as input into the calculation program. Follow the Envelope Pressure Test Procedures in the paragraphs below. Submit detailed pressure test procedures indicating the test apparatus, the test methods and procedures, and the analysis methods to be employed for the building envelope pressure (air tightness) test. Submit these procedures not later than 60 days after Notice to Proceed.

3.9.5.1 Extend Pneumatic Tubes and Establish a Reference Differential Pressure

Confirm the various zones within the envelope have a relatively uniform interior pressure distribution by establishing a representative differential pressure between the envelope and the outdoors with blower door or trailer-mounted fans operating. The number of indoor pressure difference measurements (pneumatic hoses) required depends on the number of interior zones separated by bottle necks that could create significant pressure drops (e.g., doorways and stairwells). Extend at least four pneumatic hoses (differential pressure monitoring ports) to locations within the envelope that are physically opposite of each other. In multiple story buildings, especially those over three stories, extend hoses to multiple floors. Locate the hose ends away from the effects of air discharge from blower test equipment. Select one of the four (or more) interior hoses, one judged by the test agency to be the most unaffected by air velocity produced by blower test equipment, to serve as the interior reference pressure port. Extend at least one additional pneumatic hose to the outdoors (outdoor pressure port). To the end of this hose manifold at least four hoses together and terminate each hose on a different side of the building. With the envelope sealed and the blowers energized, measure the differential pressure using the interior reference pressure port and the four outdoor pressure ports. Then measure and record the differential pressure by individually using each of the remaining three interior hoses. Ensure each reading is within plus or minus 10 percent of the reference reading. Thus, at an average 75 Pa maximum pressure difference across the envelope, the difference between the highest and lowest interior pressure difference measurements should be 15 Pa or less. If this condition cannot be met, attempt to create additional air pathways within the envelope to minimize pressure differences within the envelope. If necessary, move the interior hose ends. See step 2.13 of the Air Leakage Test Form in Appendix A.

3.9.5.2 Bias Pressure Readings

With the fan pressurization equipment de-energized and the envelope sealed, obtain the differential pressure between the outdoors and the envelope. Record 12 bias pressure readings before the pressure test and 12 bias pressure readings after the pressure test. Each reading is the average of ten or more 1-second measurements. Include positive and negative signs for each reading. To help dampen bias pressures that significantly contribute to test pressure, reduce temperature differences between indoor and outdoor air. Temperature differences can be reduced by operating test fan equipment for a few minutes to replace most of the indoor air with outdoor air.

3.9.5.3 Testing in Both Positive and Negative Directions

The preferred method for testing a building envelope is to test in both the pressurized and depressurized directions. Testing in one direction is only allowed if opposite direction testing cannot logistically be performed due to test equipment limitations or restrictions. After obtaining the pre-test bias differential pressure readings, conduct the pressure test. Record the envelope pressures (in units of Pascals) from one interior pneumatic hose (monitoring port) and the outdoor pneumatic hose(s), averaged or manifolded, with corresponding flows (in units of cfm) for each fan. Record the flow rates at least 10 to 12 positive and 10 to 12 negative building pressure readings. If conducting both positive and negative pressure tests the lowest allowable test pressure is 40 Pa and the highest test pressure is 85 Pa. Keep at least 25 Pa difference between the lowest and highest test pressure readings. Include the 75 Pa pressure value between the lowest and highest readings. The 10 to 12 readings in each direction are to be roughly evenly spaced along the range of pressures and flows. After testing is complete de-energize the equipment used to provide pressurization and obtain an additional 10 to 12 post-test bias pressure readings. None of the bias pressure readings are allowed to exceed 30 percent of the minimum test pressure. If these limits are exceeded the test fails and must be repeated.

3.9.5.4 Pressure Testing - Special Cases

3.9.5.4.1 Pressure Testing a Multiple Isolated Zoned Building

Pressure test each exterior corner zone plus at least an additional 20 percent (as measured by floor area) of remaining zones. The Contracting Officer is responsible for selecting which of these additional zones to test. If all zones pass the pressure test it is assumed that all untested zones also pass and no further testing is required. If, however, any zone fails to pass the test's leakage requirements, re-seal, and re-test until it passes in accordance with paragraph FAILED PRESSURE TEST. Test an additional 20 percent of previously untested zones. If all tested zones pass, no further testing is needed. If any zone in this group fails the test re-seal and re-test the zone until it passes. Continue this process until all the tested zones pass. When testing a zone, the doors to all adjacent zones that share a common surface with the tested zone are to have their doors opened to the outdoors. The resulting leakage from the test zoned is that through all six surfaces (4 walls, roof, and floor, for a rectangular shaped zone).

3.9.5.4.2 Pressure Testing a Building Addition

If the existing building is occupied, coordinate the pressure test with building representatives. In preparation of the test, de-energize the air handling system serving that portion of the existing building that shares surfaces with the new building addition. Pressure testing a new building addition may also require pressurizing that part of the existing building that shares surfaces in common with the new building addition. If an air barrier is applied to the common surfaces separating the existing building from the new addition, prior to the test prop open a sufficient quantity of doors and windows to keep the existing building at the same pressure as the outdoors. If an air barrier is not applied to the common surfaces separating the existing building from the new addition, pressurize that part of the existing building that shares surfaces in common with the building addition to the same level as the as the addition using separate test pressurization equipment.

3.9.5.5 Failed Pressure Test

If the pressure test fails to meet the established criteria, use diagnostic test methods described in paragraph LOCATING LEAKS BY DIAGNOSTIC TESTING to discover the leak locations. Provide additional permanent sealing measures to reduce or eliminate leak sources discovered during diagnostic testing. Retest (perform another pressure test) after sealing has been completed. Repeat this sequence of documenting test results in the test report, performing diagnostic tests, documenting recommendations for additional sealing measures in the test report, sealing leak locations per recommendations, and re-testing as necessary until the building envelope passes the pressure test and is in compliance with the performance requirements.

3.9.5.6 Air Leakage Test Report

Report volumetric flow rates and corresponding differential pressures in cubic feet per minute (cfm) and Pascals (Pa), respectively, on the Air Leakage Test Form sample form found in Appendix A. Populate the accompanying spreadsheet file titled Pressure Test Data Analysis with information obtained during the test. The spreadsheet uses equations found in ASTM E779 as a basis for calculating the envelope leakage rate. Other similar leakage rate calculation programs cannot be used or submitted for review. Submit a printout of the data input and output in the report. Should any air tightness (pressure) test fail, the pressure test report is to include data and results from all previous failed tests along with the final successful test data and results. Indicate if the resulting leakage rate did or did not meet the goal leakage requirement. Identify and document deficiencies in the building construction upon failure of a test to meet the specified maximum leakage rate.

Test reports on leakage tests performed using fan pressurization must meet ASTM E779 requirements; reports on tests performed utilizing blower door testing must meet ASTM E1827 requirements. Include the Test Agency Qualification Sheet, Air Leakage Test Form and Air Leakage Test Results Form in the written report. Document every test set-up condition with diagrams and photos to ensure the tests can be made repeatable. Document all pneumatic hose termination locations. Record in detail how the building envelope was prepared for the tests. Also describe in detail which building items were temporarily sealed. Include photos of test equipment and sealing measures in the report. Include an electronic (pdf) version of all test reports on a CD. If the building envelope fails to meet the leakage rate goal, provide recommendations to further seal the envelope and document these recommendations in the test report.

3.9.6 Locating Leaks By Diagnostic Testing

Use diagnostic test methods described herein to discover obvious leaks through the envelope. Perform diagnostic tests on the building envelope regardless of the envelope meeting or failing to meet the designated leakage rate goal. Use diagnostic test methods in accordance with ASTM E1186 and in conjunction with pressurization equipment, as necessary. Use the thermography diagnostic test to establish a baseline for envelope leakage. Apply additional diagnostic tests (find, feel, fog or other tests) as necessary to further define leak locations and pathways discovered using thermography or to find additional leaks not readily detected by thermography. Using a variety of diagnostic tests will help locate leaks that would otherwise go undetected if only a single

diagnostic test were used. Pay special attention to locating leaks at interfaces where there is a change in materials or a change in direction of like materials. These interfaces, at a minimum, include roof/wall, wall/wall, floor/wall, wall/window, wall/door, wall/louver, roof mounted equipment/roof curb interfaces and all utility penetrations (such as ducts, pipes, and conduit) through the envelope's architecture. Also use diagnostic tests to check for leakage between the air duct and duct damper, when the damper, under normal control power, is placed in the closed position.

3.9.6.1 Sealing and Re-Testing

Should leaks be discovered during diagnostic tests, thoroughly document the exact leak locations on a floor plan so that sealing can be later applied, if required or as directed. If the envelope passes the leakage test, use the diagnostic test procedure described above to identify obvious leakage locations. Seal the leaks at the discretion of the COR based on the magnitude, location, potential for liquid moisture penetration or retention, potential for condensation, presence of daylight through an architectural surface or if the leakage location could potentially cause rapid deterioration or mold growth of, or in the building envelope materials and assemblies. Apply sealing measures after diagnostic testing is complete and all pressurization blowers are off. To verify that the applied sealing measures are effective, re-test for leaks using the same diagnostic methods that discovered the leak. Reseal and retest until the envelope meets the leakage rate goal and all obvious leaks through the envelope are sealed.

3.9.6.2 Find Test

Use visual observation to locate daylight or artificial light streaming from the opposite side of the envelope. Observe all interfaces identified above.

3.9.6.3 Feel Test

Use the building's air handling system or blower door equipment to negatively pressurize the building envelope, to at least 25 Pa but no greater than 85 Pa, with respect to the outdoors. The larger the pressure difference, the easier discovering leaks by feeling them becomes. While inside the envelope, hand feel roof/wall, wall/wall, and floor/wall interfaces and utility penetrations (such as ducts, pipes and conduit) for leaks and note the leak locations on a floor plan. The "Feel" test may also be used to check for leaks between the ductwork and ductwork damper. To do this, positively pressurize the envelope and check for air movement from the envelope exterior.

3.9.6.4 Infrared Thermography Test

Coordinate thermography examination with the pressure test agency and the test agency's pressurization equipment. The pressure test agency is to allow adequate time for the thermographer to perform a complete thermographic examination, as described hereinafter, of the envelope interior and exterior, including readings of the roof.

3.9.6.4.1 Thermography Test Methods

Before thermographic testing, remove furniture, construction equipment, and all other obstructions both inside and outside the building as

necessary to gain a clear field of view. In the Thermographic Investigation Report, document all areas where obstructions remain. For exterior thermal examination of the envelope, including readings of the roof, verify that no direct solar radiation has heated the envelope surfaces to be examined for a period of approximately 3 hours for frame construction and for approximately 8 hours for masonry veneer construction. Conduct exterior investigations after sunset, before sunrise, or on an overcast day when the influence of solar radiation can be determined to be minimal. Limit exterior examinations to times when the influence of solar radiation is minimal, such as after sunset or before sunrise or during an overcast day. Conduct thermal imaging tests only when wind speeds are less than 8 mph at the time of analysis and at the end of analysis. Document any variations in wind during the test. Document all variations of test conditions in the Thermographic Investigation Report. Test only when exterior surfaces are dry. Monitor and document ongoing test parameters, such as the temperatures inside and outside the air barrier envelope, wind speed, and differential pressure.

3.9.6.4.1.1 Thermography Testing of the Air Barrier

Test the building envelope in accordance with ISO 6781, and ASTM E1186. Perform a complete thermographic inspection consisting of the full inspection of the interior and exterior of the complete air barrier envelope, to include readings of the roof. Document envelope areas that are inaccessible for testing. Use infrared thermography technology in concert with standard pressurization methods (blower doors, trailer mounted fans or the building's own air handling systems) to locate leaks through the air barrier. Adjust the HVAC system, if possible, to create or enhance the temperature difference between the envelope interior and exterior. The minimum allowable temperature difference is 9 degrees F. Maintain this temperature difference for at least 3 hours prior to the test. Use pressurization methods to establish a minimum of +20 Pa pressure difference with respect to the outdoors while using an infrared camera to view the envelope from outdoors. When viewing with the camera from inside the envelope, keep the envelope at a pressure differential of -20 Pa with respect to the outdoors using pressure testing equipment or the building's own air handling system.

3.9.6.4.2 Thermography Test Results

Document the location of all leaks, anomalies, and unusual thermal features on a floor plan or elevation view and catalog them with a visible light picture for locating the defect for correction. The thermographer is to recommend corrective actions to eliminate the leaks, anomalies, and unusual thermal features. Where leaks are found perform corrective sealing as necessary to achieve the whole envelope air leakage rate specified. After sealing, again use thermography in concert with standard pressurization methods to verify that the air leakage has been reduced. After these leaks have been permanently sealed, note all actions taken on the drawings or in the Thermographic Investigation Report. Submit the drawings for approval as part of the Thermographic Investigation Report. Also include thermographic photos that show where leaks were discovered. Include thermograms using an imaging palette that clearly shows the observed thermal patterns indicating air leakage. The Contracting Officer's Representative is to witness all testing.

3.9.6.5 Fog Test

Before using a theatrical fog generator, disable all building smoke

detectors as they may alarm when fog is issued. Coordinate fog tests and the disabling of all smoke detectors with the Contracting Officer's representative and the local fire department as necessary. Use pressure test equipment or the buildings own air handling system to positively pressurize the building envelope to at least 25 Pa but not greater than 85 Pa over the outdoors. Using a theatrical fog generator within the envelope, direct fog at suspected leakage points such as at building interfaces. Test the following interfaces: roof/wall, wall/wall, floor/wall, wall/window, roof/mounted mechanical equipment. From the vantage point immediately outside the envelope and opposite that of the interface being tested, observe the effect as the fog is issued. Detection may also be further enhanced by using a scented fog liquid or a fog liquid that produces a colored fog. Look for fog and smell for associated odor percolating through the interface. Also use smoke puffers and smoke sticks as necessary to locate leaks at these and other interface locations. If the Architectural Plus HVAC System pressure test will be/was performed introduce fog into ductwork to check for leakage between ductwork and associated dampers. After fog testing has ended, reactivate the building smoke detectors, and notify the Contracting Officer and local fire department that the test has ended. After sealing has been completed retest these areas using fog. Seal additional leaks that are found. (Note that theatrical fog may release quantities of the water vapor, glycol, mineral oil, or other media that could damage electronics and interior finishes or cause allergic reactions. Small scale smoke trace could be used as an alternative. See "Effects of Theatrical Smokes and Fogs on Respiratory Health in the Entertainment Industry" at www.nih.gov.)

3.9.6.6 Diagnostic Test Report

Once the diagnostic tests have been completed and the leakage locations identified and sealed, document these procedures, locations, and recommendations in the diagnostic test report. Submit plan and profile drawings that thoroughly identify leak locations. Describe in detail all leak locations so that the seal-up crew knows where to apply sealing measures. After sealing measures have been applied, describe the methods used along with applicable photos of the final sealed condition.

3.9.6.6.1 Thermographic Investigation Report

Submit a report of each thermographic investigation identifying the thermal discontinuities in the thermal control layer. Indicate in the final report locations to which improvements for both the air control layer and the thermal control layer were made to reduce air leaks and correct discontinuities in the thermal control layer. Include in the report some selected radiometric images of suspected failure points in the air barrier envelope that indicate before and after conditions. Devote a chapter(s) of the Thermographic Investigation Report to identifying suspected points of thermal bridging, moisture migration through roofs and walls, and insulation voids. Indicate in the final report improvements that were made to the envelope to reduce air leaks. Include the following items in the report:

a. Brief description of the building construction

b. Types of interior and exterior surface materials used in the building.

c. Geographical orientation of the building with a description of the exterior surroundings including other buildings, vegetation, landscaping, and surface water drainage.

d. Camera brand, model and serial number, and most recent calibration date; optional lenses with serial numbers (if applicable)

e. Thermographer's and Government Inspector's names

f. Date and time of tests

g. Air temperature and humidity inside the air barrier envelope

h. Outdoor air temperature and humidity

i. General information for the last 12 hours on the solar radiation conditions in the geographic area where the test is being performed.

j. Ambient conditions such as precipitation and wind direction and speed occurring with the last 24 hours, as applicable. Refer to specific requirements in each section of each thermographic inspection type for requirements in each specific area.

k. Documentation of those portions of the building envelope which were not within test conditions when the scan was performed, and which portions were obstructed by adjacent structures, interior furnishings, intervening cavities, or reflective surfaces.

l. Other relevant information, which may have influenced test results.

m. Drawings, sketches, floor plans and photographs detailing the locations in the buildings where thermograms were taken detailing possible irregularities in the components being tested.

n. Thermal images taken during the inspection with their relative locations and written or voiced recorded explanations of the anomaly listed along with visual and reference images.

o. An identification of the aspects or components of the building being examined.

p. Explanations for the type and the extent of each construction defect observed during the inspection.

q. Any results from additional measurements and investigations. Identify additional equipment used and support with type, model number, serial number, and date of most recent calibrated.

3.9.6.6.2 Fog Test Report

Document all turbulent air flow and dead air spaces within the envelope. Report fog behavior as it exits from or is entrained within the building. Include a floor plan in the report that documents the locations where fog passed through the envelope.

3.9.7 Calculation Program

To calculate the envelope leakage rate and other required outputs, input the data obtained during the pressure tests as documented in the Air Leakage Test Form (Appendix A) into the Air Leakage Rate by Fan Pressurization Excel spreadsheet. This spreadsheet can be found at the following web site:

https://www.wbdg.org/dod/ufgs/ufgs-forms-graphics-tables.

3.9.8 After Completion Of The Pressure And Diagnostic Test

After all pressure and diagnostic testing has been completed unseal all temporarily sealed items. Unless otherwise directed by the Contracting Officer, return all dampers, doors, and windows to their pre-test condition. Remove tape and plastic from all temporarily sealed openings, being careful not to deface painted surfaces. If paint is removed from finished surfaces, repaint to match existing surfaces. Unless otherwise directed by the Contracting Officer's representative, return fuel (gas) valves to their pre-test position and relight pilot lights. Return all fans and air handling units to pre-test conditions. Restore smoke/fire detectors to operating condition.

3.9.9 Repair And Protection

Repair and protection are the Contractor's responsibility, regardless of the assignment of responsibility for testing, inspection, and similar services. Upon completion of inspection, testing, or sample taking and similar services, repair damaged construction and restore substrates and finishes, protect construction exposed by or for quality control service activities, and protect repaired construction.

3.10 TRAINING

The Commissioning Provider is responsible for reviewing and approving the training plan required by Section 01 78 00 OPERATION AND MAINTENANCE DATA and identifying any deficiencies to the Contracting Officer's Representative and the Contractor's Quality Control Personnel.

Provide, coordinate, schedule, and document training for all commissioned systems as required by Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING paragraph titled "Training".

3.11 FINAL BECx REPORT

Provide a final BECx report that includes information generated by the BECx process including: BECx meeting minutes, test reports, final BECx Plan, site observations, as-built drawings (provided by the Contractor), submittals, record of training, and recommended preventive maintenance actions and intervals. These documents will be combined with the design review reports, OPR, BoD, issue and resolution logs and other documents as required by Section 01 91 00.15 22 in order to complete the documentation of the BECx process.

The government's CxC will ensure the Final BECx Report is submitted as a portion of the Cx Firm's submittal of the Final Commissioning Report for the project, as defined in Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING. Submit the BECx Report within 14 calendar days of completion of all commissioning efforts.

3.12 APPENDICES

The following forms are available for download as a MS Word file at https://www.wbdg.org/dod/ufgs/ufgs-forms-graphics-tables.

Appendix A - Air Leakage Test Form
Appendix B - Air Leakage Test Results Form

Appendix C - Test Agency Qualifications Sheet

-- End of Section --

PART 3 – PROJECT PROGRAM

1.0 PROJECT DESCRIPTION

AECOM was tasked to develop the Design-Build (DB) Request for Proposal (RFP) for repair and renovation to the existing Herdon Hall. Herdon Hall (Building 550) supports unaccompanied housing (UH) for students of the Marine Corp Intelligence School/Marine Corp Detachment (MARDET) while they are assigned to training at Dam Neck in Virginia Beach.

Marine Corp Intelligence School (MCIS) provides both basic and advanced intelligence skill training and education for Officers and Marines in preparation for duties as intelligence professionals at every echelon of command throughout the Marine Corps, other Services, and the National Intelligence Community. MCIS students are a must house population at the Installation.

The building is currently unoccupied due to continued mold issues within the rooms, degrading infrastructure, including failed Heating Ventilation and Air Conditioning (HVAC), and severe drainage, waste, and vent (DWV) system piping corrosion causing leaks. The last occupants were relocated to other housing facilities on the installation during the summer of 2025. Since then, only administrative team members and training activities occur within the facility.

Prior to AECOM's engagement, a visual Structural Facility Inspection was conducted in August 2022 that identified areas of repair and noted locations for additional investigation. To facilitate the development of the DB RFP, AECOM's Design Team conducted visual inspections of the building and surrounding site. The observations collected along with the Government Furnished Information (GFI) provided assisted the AECOM team in developing recommendations for repair and replacement, and validation of review and space programing requirements.

1.1 Existing Building

Herndon Hall, Building 550 is an existing 90,718 square-foot, three-story brick building built in 1978 with exterior corridors and separate, connected buildings that house support spaces such as laundry, lounges, and offices. The main administration building is a single-story brick building on the west side of the main building along Terrier Avenue. The last significant renovation was completed in 1998.

Building 550 is located on Naval Air Station (NAS) Oceana, Dam Neck, in Virginia Beach, less than 2,000 feet from the Atlantic Ocean. The rooms are double occupancy with a current maximum capacity of 342 students. The existing design of the building has student rooms back-to-back with a utility chase between rooms. All major building systems are beyond their useful life and the overall building condition rating is 59.

Figure 1: Existing photo of B550 from southwest.

The scope of work includes the following:

- Site work:
  - Provide ABA accessible parking
  - Provide ABA-accessible route from parking area to B550
  - Provide fire water line with PIV and FDC
  - Correct drainage/flooding problems
  - Repair cracked pavement
  - Repair uneven grading and provide positive drainage
  - Repair sidewalks
  - Replace sidewalks where cracked and or uneven joints
  - Replace and improve picnic shelter amenity space and courtyards
  - Provide smoking shelter
  - Provide landscaping
  - Provide refuse area with three refuse containers
  - Replace damaged or insufficient utilities

- Exterior renovation:
  - AT/FP retrofits
  - Repairing structural deficiencies
  - Repair of select brick veneer
  - Replace all doors and windows
  - Repair existing stairwells and replace stair/stair structure
  - Replace entry walls to sleeping room to meet ATFP
  - Replace roof

- Replace complete building Systems:
  - HVAC
  - Plumbing
  - Electrical
  - Telecommunications
  - Fire alarm and fire protection systems

- Building renovation/replacement:
  - Interior renovations to meet current standards:
  - Replacements of cabinets and flooring
  - Restrooms updates
  - Vending areas
  - Laundry Facilities
  - Replace elevator in its entirety and add a second elevator
  - Hazardous Materials abatement and mold remediation

1.2 Applicable Codes and Standards

American Concrete Institute (ACI)
- ACI 318-19 Building Code Requirements for Structural Concrete

American Institute of Steel Construction (AISC)
- AISC 360-22 Specification for Structural Steel Buildings

American Iron and Steel Institute (AISI)
- AISI S100-20, North American Specification for the Design of Cold-formed Steel Structural Members
- AISI S202-20, Code of Standard Practice for Cold-formed Steel Framing
- AISI S220-20, North American Standard for Cold-formed Steel Framing - Nonstructural Members

American Society of Civil Engineers (ASCE)
- ASCE 7-22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures
- ASCE 24, Flood Resistant Design and Construction

American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)
- ASHRAE 62.1-2016 Ventilation for Acceptable Indoor Air Quality
- ASHRAE 90.1-2019 Energy Standard for Buildings Except Low-Rise Residential Buildings

American Society of Mechanical Engineers (ASME)
- ASME 17.1-2025/CSA B44:25 Safety Code for Elevators and Escalators

American Wood Council (AWC)
- National Design Specification (NDS) for Wood Construction 2024 – with 2018 NDS Supplement
- Special Design Provisions for Wind and Seismic (SWPDS) – 2021

Committee of National Security Systems (CNSS**)** Advisory Memorandum (CNSSAM)
- Tempest /01-13, Red/Black Installation Guide

Facility Criteria (FC)
- FC 1-300-09N, 17 May 2024, Change 1, 17 April 2025, Navy and Marine Corps Design Procedures
- FC 4-721-10N, 19 May 2022, Change 1, 24 April 2025, Navy and Marine Corps Unaccompanied Housing

Green Building Initiative (GBI)
- Department of Defense Guiding Principles Compliance for New Construction & Comprehensive Replacement, Version 1.7, August 2025

International Code Council (ICC)
- IBC, International Building Code, 2024
- IEBC, International Existing Building Code, 2024
- IMC, International Mechanical Code, 2024
- IPC, International Plumbing Code, 2024

National Environmental Policy Act of 1969
- 42 U.S. Code (USC) 4321, et seq.

National Fire Protection Association (NFPA)
- NFPA 1, Fire Code, 2024
- NFPA 10, Standard for Portable Fire Extinguishers, 2026
- NFPA 13, Standard for the Installation of Sprinkler Systems, 2025
- NFPA 70, National Electrical Code, 2026
- NFPA 72, National Fire Alarm and Signaling Code, 2025
- NFPA 80, Standard for Fire Doors and Other Opening Protectives, 2025
- NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems, 2024
- NFPA 101, Life Safety Code, 2024
- NFPA 780, Standard for Installation of Lightning Protection Systems, 2026

National Institute of Standards and Technology (NIST)
- NIST 800-82, Guide to Operational Technology (OT) Security, Revision 3, September 2023
- NIST 800-53, Security and Privacy Controls for Information Systems and Organizations, Revision 5, September 2020

The Masonry Society (TMS)
- TMS 402/602-22 Building Code Requirements and Specifications for Masonry Structure

Section 106 of the National Historic Preservation Act of 1966

- 36 CFR Part 800

Unified Facility Criteria (UFC)

- UFC 1-200-01, DoD Building Code, 01 September 2022, Change 4, 17 December 2024
- UFC 1-200-02, High Performance and Sustainable Building Requirements, Change 3, 08 July 2025
- UFC 3-101-01, Architecture, 16 December 2020, Change 4, 8 January 2024
- UFC 3-110-03, Roofing, 5 January 2012, Change 5, 12 June 2020
- UFC 3-120-01 Design: Sign Standards, 1 March 2014, Change 4, 1 February 2023
- UFC 3-120-10, Interior Design, 16 May 2018, Change 3, 22 May 2025
- UFC 3-201-01, Civil Engineering, 20 December 2022
- UFC 3-201-02, Landscape Architecture, 29 April 2020, Change 1, 9 February 2021
- UFC 3-210-10, Low Impact Development, 28 August 2023
- UFC 3-220-01, Geotechnical Engineering, 1 November 2012, Change 3, 1 July 2025
- UFC 3-230-01, Water Storage and Distribution, 1 September 2018, Change 3, 1 July 2021
- UFC 3-240-01, Wastewater Collection and Treatment, 1 May 2020, Change 4, 1 October 2024
- UFC 3-250-01 Pavement Design for Roads and Parking Areas, 14 November 2016
- UFC 3-301-01, Structural Engineering, 11 April 2023, Change 6, 30 January 2026
- UFC 3-401-01, Mechanical Engineering, 28 July 2025, Change 1, 23 January 2026
- UFC 3-410-01, Heating, Ventilating, and Air Conditioning Systems, 28 July 2025, Change 1, 23 January 2026
- UFC 3-410-02, Direct Digital Control for HVAC and Other Building Control Systems, 18 July 2018, Change 2, 12 April 2021
- UFC 3-420-01, Plumbing Systems, 01 April 2021
- UFC 3-440-01, Facility-Scale Renewable Energy Systems, 1 July 2015
- UFC 3-450-01, Noise and Vibration Control, 8 December 2022
- UFC 3-490-06, Elevators, 8 June 2018, Change 1, 13 January 2021
- UFC 3-501-01, Electrical Engineering, 27 November 2024
- UFC 3-520-01, Interior Electrical Systems, 16 January 2025, Change 1, 21 January 2026
- UFC 3-530-01, Interior and Exterior Lighting Systems, 9 February 2023, Change 1, 15 December 2023
- UFC 3-540-01, Engine-Driven Generator Systems for Prime and Standby Power Applications, 1 August 2014, Change 4, 16 January 2026
- UFC 3-550-01, Exterior Electrical Power Distribution, 1 September 2016, Change 3, 01 November 2019
- UFC 3-570-01, Cathodic Protection, 28 November 2016, Change 1, 14 January 2019
- UFC 3-575-01, Lightning and Static Electricity Protection Systems, 1 July 2012, Change 1, 01 October 2021
- UFC 3-580-01, Information and Communications Technology Infrastructure Planning and Design, 21 November 2024
- UFC 3-600-01, Fire Protection Engineering for Facilities, 8 August 2016, Change 6, 6 May 2021
- UFC 3-810-01, Environmental Engineering for Facility Construction, 1 September 2025
- UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings, 12 December 2018, Change 3, 24 May 2024
- UFC 4-010-06, Cybersecurity for Facility-Related Control Systems (FRCS), 10 October 2023
- UFC 4-021-01, Design and O&M: Mass Notification Systems, 9 April 2008, Change 1, January 2010
- UFC 4-021-02, Electronic Security Systems, 28 July 2025

U.S. Access Board

- Architectural Barriers Act (ABA), Standards 2015

U.S. Department of Defense

- DoDI 5200.01, Protection of Classified Information 2012
- DoDI 8500.01, Cybersecurity, 2019
- DoDI 8510.01, Risk Management Framework (RMF) for DoD Information Technology, 2022
- DoDI 8551.01, Ports, Protocols, and Services Management (PPSM)
- DTM 08-060, Policy on Use of Department of Defense (DoD) Information Systems, Standard Consent Banner and User Agreement
- DoDD 8570.01-M, Information Assurance Workforce Improvement Program, Change 4
- DoDD 8140.01, Cyberspace Workforce Management
- OASD, The Office of the Assistant Secretary of Defense, memorandum for: see Distribution, Subject: Distribution of the Facility-Related Control Systems Master List, and the accompanying enclosure, Addendum: FRCS Master List
- Technical Guide – Design: Engineering Weather Data, 20 August 2025

U.S. Department of Transportation

- The Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD)

Virginia Department of Transportation (VDOT)

- Road and Bridge Standards (latest edition)
- Road and Bridge Specifications (latest edition)

Military Surface Deployment and Distribution Command Transportation Engineering Agency

- Better Military Traffic Engineering SDDCTEA Pamphlet 55-17 2016

1.3 Space Program per Space Type

The full space program and personnel counts can be found in Part 6, Attachment D.

1.3.1 Administrative Spaces

The administrative space consists of three (3) departments: Administrative, Maintenance, and Enlisted personnel. These departments are on the same floor to maintain adjacencies to a new unisex restroom that serves the administrative departments.

(A) **Administration:** The administrative department has a private office and an open office with workstations for three (3) personnel.

(B) **Maintenance:** The maintenance department contains an open office with workstations for two (2) personnel. This department has a primary adjacency to the maintenance storage space.

(C) **Enlisted Personnel:** The enlisted department has a private office and an open office with workstations for three (3) personnel.

(D) **Private Offices:** There are two (2) separate private offices in the building for the building manager and the duty office. The building manager's office will be located in Building 3 (Wing C) near the south parking lot. The duty office will be adjacent to the front desk in Building 4 (Administration).

(E) **Training Room:** The training room will continue as a multi-use space with nesting chairs and tables, to provide seating for a minimum of 36 occupants using tables to support up to 60 occupants. The room is located on the ground floor due to the occupant load exceeding 50 people.

1.3.2 Public Spaces

Public spaces include the lobby and front desk area with a set of men's and women's single fixture restrooms and janitors closet in Building 4 (Administration). Other required spaces include public vending and common laundry rooms.

(A) **Front Desk:** The front desk area includes fixed counter space for two-seated personnel and office equipment.
(B) **Lounges:** Lounges are multi-use spaces. Areas will be provided for group lounge seating, single lounge seating, video gaming, a large tabletop game such as pool or ping pong, and a multi-use space for training activity overflow.
(C) **Vending Area:** The current vending area is to remain on the first floor.
(D) **Laundry:** The current laundry room locations are to remain on each floor in Buildings 1 (Wing A) and 3 (Wing C). Combined, the six (6) laundry rooms must house a minimum total of 22 new washers and 43 new dryers.

1.3.3 Storage

Storage areas include general storage, janitorial storage, housekeeping storage, general maintenance storage, and maintenance storage.

(A) **General Storage:** Storage rooms are provided for each floor in Buildings 1 (Wing A) and 3 (Wing C) for storage as needed, and are to be flexible in storage capabilities.
(B) **General Maintenance:** The general maintenance room is required to be on the ground floor adjacent to Building 4 (Administration).
(C) **Janitor's Closet:** The janitor's closet is adjacent to the public restrooms in Building 4 (Administration).
(D) **Housekeeping:** A Housekeeping closet is required on every floor for vacuum storage, mop and broom storage, and contain a mop sink.
(E) **Maintenance Storage:** Maintenance storage is directly accessed through the maintenance office and contains spare supplies for the barracks.

1.3.4 Barracks

There are 169 double occupancy (Navy 2+0) units and two (2) single occupancy ABA units, for a total of 340 occupants.

Per ABA Section F233.3.1.1, 5% of total units are required to be accessible. However, based on the government's authorized reduction, the final scope includes two (2) single-occupancy ABA units. Within these rooms, the interior non-loading bearing walls will be reorganized to accommodate a fully accessible living and bathroom (shower, toilet, sink).

The barracks units will each have a bathroom with vanity and the room will be furnished with the following items per occupant: a bed, nightstand, dresser, desk, chair, built in closet, and medicine cabinet. Each shared or single ABA sleeping unit will contain a refrigerator, microwave, counter space, and ironing board.

2.0 PROJECT OBJECTIVES

2.1 Mission Statement

MCIS provides both basic and advanced intelligence skill training and education for Officers and Marines in preparation for duties as intelligence professionals at every echelon of Command throughout the Marine Corps, other Services, and the National Intelligence Community.

This project will completely repair Student Housing Building 550 at NAS Oceana, Dam Neck in Virginia Beach. Critical repairs will be performed to provide adequate student housing for junior enlisted personnel.

2.2 Facility Function

The renovations and system replacements described in this DB RFP will restore Building 550 to support mission needs to house unaccompanied students during temporary duty assignments to MCIS/MARDET. Renovations will include updates to all barracks, updated infrastructure to support classroom activities, administrative support, and living spaces that are modern, clean, and provide a space for students to utilize outside training.

2.3 Project Specific Priorities

The primary use of this facility as a barracks supports a high turnover of occupants in direct support of training course lengths. The renovation and repair of Building 550 must provide durable barracks and public spaces that provide the occupants with a comfortable, easy to clean and maintain living space. For Administrative team members, the office and maintenance spaces must support mission activities, while classroom spaces must remain flexible to accommodate check-ins and briefs to training units.

2.3.1 Sustainable Design and Construction

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

Design and construct project in accordance with UFC 1-200-02, High Performance and Sustainable Building *Requirements*. Achieve Third-Party Certification (TPC) of sustainable design using Green Building Initiative's (GBI) Department of Defense Guiding Principles Compliance (GPC) program.

2.3.2 Resiliency

The renovation will not alter the existing finished floor elevation (FFE), which is below the Design Flood Elevation (DFE). Due to the building's proximity to wetlands and coastal elements, flood damage mitigation measures must be incorporated to address natural hazard risks, including but not limited to:

(A) Raised equipment pads including transformers, pad-mounted gas switch, mechanical and plumbing equipment.
(B) Raise the switchboard on the first floor to the greatest extent possible.
(C) Use moisture-resistant drywall throughout the first-floor.
(D) Configure the elevator to default to the second floor during water-related emergencies.

The DB team must use the DoD Regional Sea Level (DRSL) to determine the Design Flood Elevation (DFE).

2.3.3 Storm Water Management - Low Impact Development (LID)

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

2.3.4 Energy Efficiency

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

(A) Provide an aerosolized acrylic seal to the entire building to form airtight seals to reduce energy loss through the building envelope. The product must be non-toxic and water-based. Coordinate with Building Commissioning, Air Barrier Performance Testing in the RFP, and Part 3, B20 EXTERIOR ENCLOSURE.

(i) Product: AeroBarrier X1 as manufactured by Aeroseal. www.aeroseal.com/aerbarrier

(B) Refer to Part 3, section 6.0 Engineering Systems Requirements, D30 HVAC and Part 6 Attachments, Attachment V Mechanical Calculations and Attachment W Solar PV Analysis for details applicable to the preliminary life cycle cost analysis, preliminary energy model, and requirements applicable to further development of the calculations. Provide a final energy model which meets or exceeds the estimated percentage improvement over the ASHRAE 90.1-2019 baseline as presented in the preliminary energy model.

2.3.5 Building Commissioning

Provide commissioning to meet requirements identified in Section *01 91 00.15 22 Total Building Commissioning, and UFC 1-200-02 High Performance and Sustainable Building Requirements.*

2.3.6 Accessibility Requirements

Provide barrier-free design in accordance with UFC 1-200-01, DoD Building Code (G*eneral Building Requirements)*.

2.3.7 Antiterrorism Criteria

Design the facility to comply with UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings and the criteria for Existing Buildings in Section 1-6.2.

Standard 1: Exempt (existing building is within installation perimeter)
Standard 2: Comply with unobstructed space requirements
Standard 3: Removed
Standard 4: Removed
Standard 5: Not applicable
Standard 6: Not applicable.
Standard 7: Required
Standard 8: Required
Standard 9: Required
Standard 10: Required
Standard 11: Existing building meets building entrance layout requirements
Standard 12: Required
Standard 13: Not applicable
Standard 14: Required
Standard 15: Required
Standard 16: Required

Standard 17: Not applicable
Standard 18: Required
Standard 19: Required
Standard 20: Not applicable
Standard 21: Required

2.3.8 Cybersecurity

Design, acquire, and execute all control systems (including systems separate from management utility monitoring and control systems) in accordance with UFC 4-010-06 Cybersecurity of Facility-Related Control Systems and as required by individual Facilities Engineering Command (FEC) or Installation implementation policy.

The project is designated as “Mission Support” in accordance with the C-I-A (Confidentiality-Integrity-Availability) Cyber Risk Management Framework (RMF), as stated in RFI 8, dated 22 October 2025.

Upon contract award, the Contractor must submit to the Government, for their records, a resume for a Cybersecurity Control System Integrator and Network Administrator who meets DODD 8140.01 requirements for Information Assurance Technologist (IAT) Level II. The resume must be submitted to the Government within 14 days after receiving notice to proceed. All certifications must be in effect prior to the start of work. The qualified Control System Integrator and Network Administrator will serve in the position across the entire contract and must be the primary Point of Contact between the Contractor and NAVFAC MIDLANT CIO Cybersecurity Team to determine which requirement(s) apply to the project.

The CIO2 MIDLANT Point of Contact to be utilized in the SECTION 25 05 11 is:

Nhelly Reeves
Cybersecurity Project Manager
Office: 757 341 0063

The Government’s CIO2 Cybersecurity Division Director/Command Installation System Security Manager (ISSM) for NAVFAC will be the primary point of contact for all Cybersecurity work related to facility control systems performed under this contract.

Within 60 calendar days after the contract award, the Contractor must schedule a Cybersecurity Kickoff Meeting with the Contracting Officer’s Representative (COR) and/or the Government's Project Manager and the NAVFAC MIDLANT CIO Cybersecurity Team. The meeting will be located at a specific time and place determined by the Contracting Officer.

The contractor is directed to UFGS 25 05 11 CYBERSECURITY FOR FACILITY-RELATED CONTROL SYSTEMS for detailed cybersecurity requirements for all Contractor Personnel.

No Risk Management Framework Authorization work under this task order will be performed for any Facility Related Control System other than what is listed below. Any Authorization to Operate as per the Department of Defense RISK MANAGEMENT FRAMEWORK will be coordinated with the Navy, NAVFAC Chief of Civil Engineering, and the Functional Authorizing Official (FAO), who has jurisdiction for authorizing all Navy ashore control systems. The Government’s CIO2 Cybersecurity is the Division Director/Command Installation System Security Manager (ISSM) for NAVFAC.

The contractor is responsible for contacting the CIO2 for the following Facility-Related Control Systems regarding the control systems' Loss of System Impact Confidentiality, Integrity, and Availability. This is in accordance with UFC 4-010-06.

ESR D30, HVAC

FRCS associated with HVAC/DDCs Systems are defined in the Engineering System Requirements, D30 HVAC of this document. The Contractor is directed to utilize UFGS 25 05 11 Cybersecurity for Facility-Related Control Systems for cybersecurity requirements and is required

to further tailor the document based on the C-I-A criteria provided by the CIO2. The Contractor is responsible for ensuring that all cybersecurity requirements are met when integrating the HVAC system with the building's DDC Control System and the DDC Control System with the Naval Station Norfolk (NSN) Utility Monitoring and Control System.

ESR D40, FIRE PROTECTION

FRCS associated with Fire Alarm and Detection Systems are as defined in the Engineering System Requirements, D40 Fire Protection. The Contractor is directed to utilize UFGS 25 05 11 Cybersecurity for Facility-Related Control Systems for cybersecurity requirements and is required to further tailor the document based on the C-I-A criteria provided by the CIO2. The Contractor is to ensure that all cybersecurity requirements are met.

ESR D50, SECURITY SYSTEMS (ESS)

FRCS associated with Electronic Security Systems are as defined in the Engineering System Requirements, D50 Security Systems. The Contractor is directed to utilize UFGS 25 05 11 Cybersecurity for Facility-Related Control Systems for cybersecurity requirements and is required to further tailor the document based on the C-I-A criteria provided by the CIO2. The Contractor is to ensure that all cybersecurity requirements are met.

ESR D50, LIGHTING CONTROL SYSTEMS

FRCS associated with Electronic Security Systems are as defined in the Engineering System Requirements, D50 Light Equipment. The Contractor is directed to utilize UFGS 25 05 11 Cybersecurity for Facility-Related Control Systems for cybersecurity requirements and is required to further tailor the document based on the C-I-A criteria provided by the CIO2. The Contractor is to ensure that all cybersecurity requirements are met.

Design, acquire, and execute all control systems (including systems separate from management utility monitoring and control systems) in accordance with the most recently released publications, guidelines, and regulations as of contract award. Design according to UFC 4-010-06 Cybersecurity of Facility-Related Control Systems as outlined in UFGS 25 05 11 CYBERSECURITY FOR FACILITY-RELATED CONTROL SYSTEMS, which is included, and as required by individual Facilities Engineering Command (FEC) or Installation implementation policy as of contract award.

The contractor must design the project using UFGS 25 05 11, *Cybersecurity for Facility-Related Control Systems*. Elements of the NAVFAC Cybersecurity Hygiene Checklist must be implemented into contract specifications by using SECTION 25 05 11, CYBERSECURITY FOR FACILITY-RELATED CONTROL SYSTEMS, including a Cybersecurity Plan and Cybersecurity Hygiene Report. ICS Security Controls are to be incorporated utilizing located NIST 800-82 Revision 3, Appendix F, Table F-1. All control systems must be planned, designed, acquired, executed, and maintained in accordance with the following Department of Defense guidelines and requirements, as outlined in UFGS 25 05 11 Cybersecurity of Facility-Related Control Systems, which is included.

According to the NAVFAC Team, in accordance with NAVFAC Standard Operating Procedures, the proper completion of UFGS 25 05 11 satisfies the NAVFAC Cyber Hygiene requirement. The contractor will follow the UFGS 25 05 11 for testing. The contractor will be responsible for ensuring subject matter experts/technicians are on hand to maintain the operations of FRCS during vulnerability testing. The contractor is required to take the proper measurements while ensuring the FRCS remains intact and operational during and after testing. The contractor will be solely responsible for all vulnerability testing. Upon request from the contractor, and if available; the government can assist by providing vulnerability testing software. The contractor is required to coordinate vulnerability testing with NAVFAC MIDLANT CIO2 when such vulnerability testing might have any impact on already existing, fully functional, and fully operational control systems. However, the contractor is still solely responsible for the vulnerability testing when assistance is requested from NAVFAC MIDLANT CIO Cybersecurity Team.

The contractor will compile a list of all available software patches and updates needed for the system. The patch and update list must include the hardware and software to which any patch or update applies. Each line item must include the type and version of the patch or update. The Contractor is NOT required to provide a list of the patches and updates that were NOT installed during the construction or warranty period. The Patch and Update List must be submitted to the NAVFAC MIDLANT CIO Cybersecurity Team.

Information in the final cybersecurity documentation must represent that system's devices/modules/equipment in their final states after completion of all installations. Upon the Government's System Owner's (SO) final acceptance of the control system, should any alteration be required for the control system, no alterations must be made to systems or devices/modules/equipment after submission of final cybersecurity documentation without the written permission of that Government's System Owner (SO). Documentation must be updated to reflect such alterations and must be done in writing.

2.4 Appropriate Design

Comply with UFC 1-2001-01, DoD Building Code for planning and design requirements for this project. See full UFC and Compliances as listed in Section 1.2 Applicable Codes and Standards and throughout this RFP.

2.5 Workflow Process

2.5.1 Hours Of Operation

Building 550 will be occupied 24 hours a day 7 days a week.

2.5.2 Staffing/Occupancy

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

See Part 6, Attachment D for occupancy counts per department.

2.6 Special Design Challenges

2.6.1 Existing Conditions

Building 550 is currently unoccupied due to extensive mold and moisture conditions throughout each of the three barrack wings. The only spaces currently being utilized are common lounges, classrooms, and administrative spaces.

As part of the scope of work for this project, the Contractor will be required to perform mold and hazardous materials abatement prior to beginning repair work. Additionally, materials to be installed on, around, or within the building must be rated for corrosive environments due to the buildings close proximity to both the Atlantic Ocean and wetlands.

Further investigation to review structural components is required prior to repair throughout.

2.6.2 Building Footprint

The repair of this project falls under Operations and Maintenance (O&MN) funding, as a result the building footprint can only be increased to accommodate code required space. As part of this repair an additional elevator is required (for a total of two (2) elevators) and the layout and design must be kept in line with the symmetry and context of the existing building. The elevators will be placed, one between Wing 1 (A) and Wing 2 (B) and the second between Wing 2 (B) and Wing 3 (C). To meet current code requirements the existing elevator will be demolished and replaced and a 2nd elevator will be installed

2.6.3 Exterior Doors

UFC 4-010-01 DoD Minimum Antiterrorism Standards for Buildings, Standard 12 states: "For all new and existing buildings covered by these standards, ensure that all exterior doors into inhabited areas open outwards."

Due to the existing layout of the building, swinging the doors outward in their current configuration would impede the egress path on the exterior corridors. In order to meet this standard, the door and immediate exterior wall can be reconfigured to be inset to allow for out swinging barrack entry doors that do not impede more than seven-inches in the corridor and still maintain the required egress width.

The figure below shows a concept for the revised door configuration.

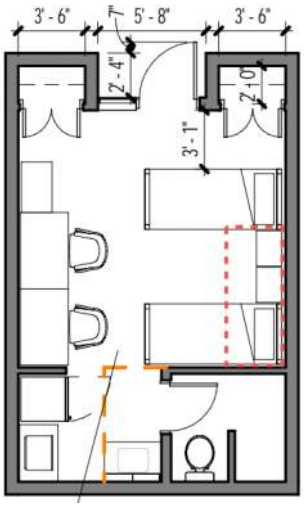

Figure 2-1: Revised Door Configuration

2.6.4 Shower Drainage and Accessibility

As part of the renovation, all bathrooms will be renovated to improve functionality, plumbing and mechanical challenges, and accessibility. The existing showers have rear drains that currently discharge towards the plumbing chase in each of the three wings. This configuration will be maintained due to the existing structural restrictions and applied as follows::

(A) **Standard Barracks Spaces:** Standard Barracks Spaces: Existing tile and terrazzo showers will be demolished to the studs and down to the existing topping slab. A new shower base extender that allows for a center drain and horizontal piping to the plumbing chase will be installed under a new shower base. The trap will be installed in the chase before connecting to the primary drain system. The curb on the entry side should be no higher than 6”.

(B) **Accessible Barracks Bathrooms:** Accessible Barracks Bathrooms: Existing tile and terrazzo showers will be demolished as well as the two inch (2”) topping slab corresponding to the location of the new shower floor. A rear drain, similar to the existing, will be installed at the lowest point, and the shower floor will be built up and tiled with enough slope to provide positive drainage. The entry side must be barrier-free access. The remaining bathroom floor will be gradually sloped as required to the entrance side of the shower to allow for barrier-free transition to the shower.

2.7 State Historic Preservation Office (SHPO)

Although no impacts to cultural resources are expected as a result of this project, the National Register-eligible Surface-Launched Guided Missile School Historic District (DHR ID 134-5290) is located

approximately 800 feet from the site, and the installation would consult with the Virginia Department of Historic Resources (SHPO) to address any potential viewshed concerns.

2.7.1 Design-Build Team Submittal Requirements

Design Build Contractor to coordinate with the Installation Cultural Resources Manager at each design submittal and provide SHPO documentation required for a consultation. The DB contractor must provide the following in accordance with the Contract and the Secretary of the Interior's Standard for Rehabilitation and Guidelines for Rehabilitating Historic Buildings guidance : –

(A) Brief project description.
(B) Design plans, specifications, and construction schedule.

3.0 SITE ANALYSIS

3.1 Existing Site Conditions

The proposed site is located at the Marine Corps Intelligence School / Marine Corps Detachment Dam Neck Student Housing, Building 550, at Dam Neck Annex, Naval Air Station Oceana. The site is bounded by Building 534 to the north, wetlands to the east, Building 566 to the south, and Terrier Avenue to the west.

The existing site contains four structures, a network of sidewalks, a picnic area with shelters, and grassed areas. The site is relatively flat, with a gentle slope from west to east toward the wetlands. Site elevations range from approximately 4 to 8 feet.

All existing areas not occupied by structures, sidewalks, or parking are landscaped with turf or plantings. Mature oak trees, approximately 15 to 18 inches DBH, are located between the building and the adjacent parking area to the south. Landscaped beds are present in front of and along the sides of the office building, with a few scattered trees located in front of the office.

The wetlands referenced above have not been officially designated by the Virginia Department of Environmental Quality (DEQ), the Virginia Marine Resources Commission (VMRC), or the U.S. Army Corps of Engineers (USACE).

The following outlines existing conditions should be considered in project planning and construction:

(A) To the east of the building there are existing wetlands that must not be disturbed or encroached upon. Special care and consideration to construction around this area must be closely monitored.

(B) Due to Building 550s existing site constraints, it is bordered by a newer Bachelor Enlisted Quarters to the north, wetlands to the east, an existing parking lot to the south, and along Terrier Avenue to the west. The Contractor must account for limited access, consideration for pedestrian traffic, and maintaining vehicle access.

3.1.2 Natural Site Constraints

Natural constraints around Building 550 are limited. The site primarily consists of maintained lawn areas, structures, sidewalks, and turf, with a limited number of mature trees. There is a wetland area to the east. This wetland must not be impacted by the proposed construction.

3.1.3 Existing Vehicular Access, Circulation, and Parking

Existing vehicular access to the site is limited to a semi-circular, one-way drop-off and loading drive lane located in front of the office. The drive lane is accessed directly from Terrier Avenue.

Resident and staff parking is provided in two areas: one located across Terrier Avenue to the west, and another adjacent to the site to the south. In the western parking area, the first row along Terrier Avenue is dedicated to Building 550. In the southern parking area, the first row is also dedicated to Building 550.

The western parking area will remain unchanged. The southern parking area will be reconfigured to accommodate all required ABA-accessible parking and a refuse area. Refer to the civil schematic drawings in Part 6.

3.1.4 Geologic and Geotechnical Site Conditions

A subsurface exploration program was performed to investigate the subsoil conditions within the proposed site layout. A total of eight (8) soil borings and one (1) seismic piezocone sounding test (SCPTu) were conducted, as well as four (4) dynamic cone penetrometer (DCP) tests and installation of two (2) temporary groundwater monitoring well. A Geotechnical Data Report is presented in Part 6 Attachment P.

The subsurface materials encountered in the soil borings are described below for the purposes of our discussions in this report. It should be noted that these descriptions do not imply the continuity of the materials encountered in the borings. The descriptions of the materials have been established to characterize similar subsurface conditions based on material gradations and parent geology. The subsurface materials encountered in the soil borings, along with the range of Standard Penetration Test (SPT) N-Values are described below.

Approximately 3 to 11 inches of surficial soils were encountered at the project site. These depths should not be considered a stripping depth since the surficial soils may be thicker at other areas of the site. A subsurface soil profile was prepared illustrating subsurface soil conditions at the subject structure (including the SCPTu data) and is included in Figure 3.

Ground Cover (Surficial Soils)

Soil borings B-1, B-2, BMP1, and BMP-2 were drilled on existing grass areas. The surficial soils were measured at each location from about 0 to 6 inches. Soil borings B-3, B-4, B-5, and B-6 were drilled on the existing asphalt pavement. The asphalt and crushed stone thicknesses were measured at each hole.

Stratum A (Uncontrolled FILL)

Uncontrolled fill soils were encountered from the ground surface to depths of about 0.0-ft to 5.2-ft below existing grades, approx. EL 5-ft to EL -2-ft. The uncontrolled fill soils consist of Silty Sand and Clayey Sand. Stiff Lean Clay with Sand was observed in boring B-1. The N values ranged from 6 blows per foot (bpf) to 22 bpf. CPT tip resistance within the uncontrolled fill soils varied approximately between 0 tsf and 60 tsf.

Stratum B (Tabb Formation)

Alluvial soils of the Tabb Formation were encountered beneath Stratum A and extended to depths of about 10-ft to 20-ft below existing grades, approximately EL -5-ft to EL -10-ft. The Alluvial sands consisted of very loose to medium dense Clayey Sand (SC), Silty Sand (SM), Poorly Graded Sand (SP), Poorly Graded Sand with Silt (SP-SM). Alluvial cohesive soils consisted of soft to medium stiff Sandy Fat Clay (CH) and Lean Clay (CL). The N values ranged from approximately 2 bpf to 30 bpf. CPT corrected tip resistance for the existing soils generally varied approximately between 3 tsf and 80 tsf.

Stratum C (Yorktown Formation)

Yorktown Formation soils were encountered beneath Stratum B and extended to boring termination depths. Yorktown Formation sands consisted of very loose to very dense Clayey Sand (SC), Silty Sand (SM), Poorly Graded Sand with Silt (SP-SM). Yorktown cohesive soils consisted of very soft to stiff Silt with Sand (ML), Sandy Silt (ML), Silt (ML), Elastic Silt with Sand (MH), Lean Clay with Sand (CL). The N values ranged from approximately weight of hammer over 24-inchs to 89 bpf. CPT corrected tip resistance for the existing soils generally varied between 4 tsf and 80 tsf.

Groundwater

Groundwater depths ranged from about 1.7-ft bgs to 7.4-ft bgs or between approximate EL 2.3 and EL -2.4-ft. The groundwater observations are also included in the soil boring logs included in Appendix B. Seasonal perched water conditions may be encountered during construction due to the presence of fine-grained soils interbedded with free-draining sandy soils. It is possible that stabilized groundwater levels are higher than those obtained from the soil borings. Based on monitoring data from Natural Resources Conservation Service (NRCS), the estimated shallow high groundwater table (ESHWT) is approximately 3.51 ft bgs in the vicinity of the project site.

3.1.5 Environmental Constraints

The project must comply with the Endangered Species Act (ESA; 16 U.S.C. §1531–1544) by protecting threatened and endangered species and their habitats in accordance with the requirements outlined in the Environmental Checklist (Attachment L). Wildlife on the installation

must not be approached, handled, relocated, fed, harassed, collected, or killed, and no wildlife or plants (including feral animals) may be disturbed without proper authorization or permits; harming or harassing ESA-protected species is illegal. Any wildlife emergencies on base should be reported to the Installation Command Duty Officer, who will coordinate with Natural Resources staff. All observations of protected species must be reported immediately to the Installation Natural Resources Manager, and personnel should remain at least 50 feet away, provide photographs if possible, and document the location of the observation for further guidance.

Surveys or time-of-year restrictions for vegetation clearing and tree removal are necessary to comply with the Migratory Bird Treaty Act (16 USC 703 et seq.) and prevent the taking of migratory birds or their eggs. Ensure to survey the work site and laydown area for any birds and active bird nests (with eggs/chicks). If active nests are found, maintain a 25-foot buffer around the nest and avoid working within that buffer until the nests are empty. Do not harm or remove active nests. Contact the Installation Natural Resources Manager for further guidance and action if an active nest is present on the project site or if an injured bird is found on the project site.

As of March 2025, no eagle nests are located within 660 feet of the project site, though eagles are known to nest in the area. The location of any eagle nest should be confirmed with the installation prior to the start of construction. If a nest is confirmed within 660 feet, consultations, permits, mitigation, monitoring, and potential work restrictions may be required. Osprey nest may also occur on site and should not be disturbed if present. Contact the Installation Natural Resources Manager for further guidance if an osprey nest is present.

Coordinate all vegetation clearing and tree removal activities with the Installation Natural Resources Manager. No tree impacts are authorized 01 April through 15 July and 15 December through 15 February. In addition to time-of-year restrictions for removing trees or pruning branches larger than 3 inches, tree mitigation requirements may apply for any trees removed.

To avoid the spread of invasive species, equipment that is used to perform the work should be cleaned before being brought to the installation and prior to leaving the installation. On-base soil or organic material should be properly disposed of off base unless returned to its original location, and any materials brought on base are recommended to be certified noxious-weed-free. Disturbed areas should be reseeded with vegetation or grass seed mixture that includes native species. Personnel should take precautions when working around wildlife and known hazards such as poisonous plants, venomous snakes, insects, and disease vectors, and ensure equipment and temporary housing are secured to prevent wildlife entry, including sealing small openings that could allow bats or other species to enter.

Control air emissions by keeping all paint, solvent, and waste containers closed except when adding or removing material. Paint containers may be air dried only after all practicable liquid has been removed and less than one inch of residue remains. Minimize emission from spraying operations using containment measures such as shrouds or tarps. Control dust during demolition using BMPs such as water suppression. The project must comply with Virginia Regulations for Asphalt Paving Operations (9VAC5 Chapter 5, Article 7). Per NASO Title V permit requirements, only emulsified asphalt may be manufactured, mixed, stored, used, or applied for paving operations. All refrigerant-related work must be performed by EPA-certified technicians using EPA-approved recovery or recycling equipment in accordance with 40 CFR 82. Refrigerant-containing equipment removal must follow Refrigerant Removal EV Guidance, with required forms submitted to the NASO Recycling and Facility Management Division.

Hazardous waste generation is anticipated for this project; therefore, the installation environmental office must be contacted prior to the start of work to determine applicable waste streams and disposal requirements. Hazardous waste must be characterized in accordance with 40 CFR 262.11, with all profiling, manifesting, and disposal coordinated through the Installation Hazardous Waste Program Manager and NAVFAC MIDLANT EV Services. All construction and demolition debris and any excavated soil not reused on site must be characterized in accordance with Virginia hazardous and solid waste regulations and managed at an appropriate off-site facility in coordination with the Waste Media Manager and applicable soil SOP. If spills of petroleum, oils, and/or lubricants (POL) occur, follow spill response procedures. Maintain spill kits

on site and ensure operators are trained in their use. If any POL containers or tanks are utilized during the project or any abandoned fuel storage tanks, and/or petroleum-contaminated soils/groundwater are encountered, contact the NAS Oceana Tanks/POL Project Manager. See Section 3.2.2 for additional information regarding building hazardous materials.

A detailed Geotechnical and Environmental data report is presented in Part 6 Attachment P with all the environmental analytical test results. Environmental analytical results indicate that shallow soil composites (1–4 ft bgs) contained multiple detected metals, with arsenic exceeding Virginia Residential Screening Levels and EPA Residential RSLs at both locations, while all other metals remained below applicable residential/industrial criteria. Various SVOCs were detected in both borings, with benzo[a]pyrene exceeding Virginia Residential Screening Levels (as noted in the dataset), and all other SVOCs below screening levels. TPH (DRO/GRO) was detected but was below applicable screening criteria; PCBs (PCB-1260 and total PCBs) were detected and were also below screening levels; VOCs were limited to methyl acetate in both borings and were below screening levels.

Groundwater results similarly showed multiple metals detections, with chromium and lead exceeding both Virginia General Permit Discharge Limits and EPA MCLs; arsenic and beryllium exceeding EPA MCLs but not Virginia discharge limits; and nickel, thallium, and zinc exceeding Virginia discharge limits but not EPA MCLs, while other metals were below criteria. VOCs were detected, but no VOCs exceeded Virginia discharge limits or EPA MCLs; SVOCs were detected in both wells but remained below applicable discharge limits and MCLs; and TPH results showed DRO detected in both wells below criteria, with GRO not detected.

Additional details regarding environmental constraints are available in the Environmental Checklist (Attachment L). The Environmental Checklist must be consulted and maintained throughout the design process to document compliance with applicable environmental regulations.

3.1.6 Permitting and Agency Review

A Categorical Exclusion (CATEX) is anticipated for this project but will not be issued until the design phase. A signed CATEX is required prior to authorizing any site work (Attachment M). The Environmental Checklist (Attachment L) must be updated by the project designer with each design submittal to reflect current project information, as an updated Environmental Checklist will be required for issuance of the CATEX. Document permits associated with the project in the Permit Record of Decision (PROD) Form (Attachment K).

The project will require ESA consultation due to potential impacts on several federally protected species. ESA determinations are made by the Installation Natural Resources Manager, with contractors supporting consultation package development as needed. If the project complies with time-of-year restrictions, tree clearing limits, lighting requirements, and assumptions stated in the Environmental Checklist, a “may affect, not likely to adversely affect” determination is anticipated, with USFWS concurrence typically taking up to 65 business days.

Air permits may be required for the construction or modification of the following types of emission sources: air conditioning and refrigeration system maintenance, service, repair, and disposal; asphalt paving; boilers; demolition; dust producing activities such as concrete crushing; internal combustion engines (e.g., fuel fired stationary generators, compressors, pumps); painting; and paint removal. Notify the FMS and Environmental Air Manager in advance of any work that involves installation, replacement, or modification of any air emission unit or process to ensure Federal and State Clean Air Act requirements are met.

The proposed project involves land disturbance of >10,000 square feet but less than one acre. An Erosion & Sediment Control Plan must be developed and approved by the Virginia Department of Environmental Quality (VDEQ) in accordance with the Virginia Erosion and Sediment Control Laws and Regulations. Additionally, the contractor is required to obtain a VAG83 permit and coordinate with the PWD Oceana Water Program Manager prior to conducting dewatering activities. See Section 3.2.6 for additional information.

The proposed project/renovations are located adjacent to wetlands/WOTUS. If wetland impacts cannot be avoided, a Joint Permit Application (JPA) must be prepared by the contractor and submitted to the appropriate agency for review and permitting. As such, the project will require funding for this permit action and any required mitigation for unavoidable permanent wetland impacts. NAS Oceana Wetlands Program Manager must review the JPA prior to submittal.

For laydown areas and any other outdoor work areas, appropriate erosion and sediment control must be utilized to avoid discharge to adjacent wetlands, waterways, ditches, and other stormwater systems. No equipment nor materials must be utilized and/or stored in wetlands or waterways without proper permits.

Stormwater drains and ditches immediately adjacent and within project work zone connect to waters of the U.S. that are considered linear wetlands and protected under the Clean Water Act. Inappropriate erosion and sediment control that results in a release of material into an upland section of ditch which then runs into wetland/waters of the U.S. is considered fill of wetlands and subject to the issuance of a notice of violation under the CWA.

This project requires consultation in compliance with Section 106 of the NHPA. See Section 2.8 and Part 6 (Attachment L) for additional information.

3.1.7 Existing Wetland Protection

Before, during, and after construction the Contractor must implement protection for the adjacent wetlands. Information must be provided as part of the temporary controls plans and incorporated into daily construction activities. Plans and reporting methods must be coordinated and reported to the installation.

Refer to Part 3, Chapter 3.2.6 and Chapter 6, ESR G103011.

3.2 Site Development Requirements

3.2.1 Building Footprint

The building footprint is to remain except for the existing elevator shaft and associated machine room which will be demolished and two new elevator shafts, mechanical rooms, and lobbies will be constructed.

See Part 3, Section 4.2 for further information of space program requirements.

3.2.2 Demolition

The Contractor is required to provide all demolition necessary to repair the facility and to provide all required work to maintain the intended use of existing items such as building envelope and sidewalks.

The extent of site demolition supports the repair of existing site and landscaping components, as well as preparing the site for accessibility upgrades.

For Selective Building Demolition and Hazardous Materials information, refer to Part 3, Chapter 4, Section 4.1.

3.2.3 Vehicular Access and Circulation

Access to the surrounding building along Terrier Avenue must be maintained throughout the duration of construction. Provide access that accommodates maneuvering for all anticipated vehicles such as emergency, waste, passenger, service, and delivery vehicles.

3.2.4 Grading and Drainage

New grading shall generally follow existing drainage patterns. Due to site constraints, surface flow patterns and drainage areas contributing to the storm sewer systems will remain unchanged. Overall the existing grading is not anticipated to affect existing stormwater management.

The site contains two on-site storm sewer systems and one system in the southern parking area, all of which discharge to the wetlands to the east. The two on-site storm sewer systems must be inspected using CCTV to determine their condition.

Each of the two courtyards must be provided with two new storm sewer inlets connected to the existing system. The courtyards shall be regraded as necessary to drain to the new and existing inlets. Based on available construction plans, the storm systems are presumed to discharge to the wetlands; however, the surveyor was unable to locate the outfalls in the field.

3.2.5 Pedestrian Access and Circulation

Provide continuous walkways throughout the site to facilitate pedestrian movement. Walkways must match connecting walkway width, with a minimum walkway width of 6-foot wide (unless noted otherwise), have a maximum running slope of 4.5 percent, and a maximum cross slope of 2 percent and a minimum of 1 percent. Finished of walkways must match existing walkways (medium broomed finish perpendicular to the direction of travel). Expansion joints must be pre-formed cork expansion joint material with sealant. Connect the accessible parking with the student housing in a direct manner.

Provide concrete ramps and stairs with handrails for changes in grade that cannot be accommodated with sloped walkways. Treads of stairs must have grooved detailing at the nose of the stair to accentuate the edge for visually impaired pedestrians.

Provide accessible concrete ramps at pedestrian crossings on curbed roadways and entrance` drives.

Replace all existing sidewalk sections within the project area that are more than 0.25 inches above or below the adjacent slabs to eliminate all trip hazards.

3.2.6 Erosion and Sediment Control and Stormwater Management

The proposed project involves land disturbance of >10,000 square feet but less than one acre. An Erosion & Sediment Control Plan must be developed and approved by the Virginia Department of Environmental Quality (VDEQ) in accordance with the Virginia Erosion and Sediment Control Laws and Regulations. A copy of the approved E&S Control Plan must be retained onsite at all times, and the plan must be adhered to throughout project execution. Since E&S Controls will be necessary for this project, the project operator should be prepared to budget for the necessary installation and maintenance of E&S Control measures (to include expenses for possible additional controls if necessary throughout duration of the project).

As proposed, this activity will not result in land disturbance equal to or greater than 1 acre; therefore, a Stormwater Pollution Prevention Plan (SWPPP) and coverage under the VPDES Construction General Permit (VAR10) will NOT be required. If the project scope changes and proposed land disturbance goes over 1 acre, these items will be required. VDEQ generally reviews ESC and Stormwater Management plans within 60 days of receipt of a complete submittal.

A copy of the approved ESC Plan and Stormwater Management Plan, if applicable, must be maintained onsite at all times, and all ESC measures must be implemented and maintained throughout construction.

If this project will result in a new impervious footprint that exceeds 5,000 square feet, site planning and design must include post-construction stormwater management features in accordance with EISA, sect. 438 and the DON LID Policy. MS4 construction stormwater inspection costs must also be factored in.

3.2.7 Landscaping

The landscape scope of the project must provide sustainable, aesthetic, and functional grounds for the Building 550. The landscaping must be clear and organized, and include the following amenities, such as site furnishings and pedestrian lighting. The landscape treatment must enhance the quality of life and livability for the users and the detailing must serve the following purposes (per the Naval Air Station Oceana Dam Neck Annex Installation Appearance Plan (2008) (Attachment Q)):

- Emphasize building entrances
- Enhance pedestrian safety
- Provide a consistent and coherent identity
- Enhance the pedestrian environment
- Define outdoor spaces and courtyards
- Provide visual interest throughout the year
- Screen utilities, parking, and other unattractive elements

Selection of plant species is to be from regionally native species (Virginia Coastal Plain – http://vaplantatlas.org), emphasize low-maintenance requirements, do not require permanent irrigation, and are planned for mature size to avoid future conflicts and maintenance requirements. Landscape must comply with AT/FP requirements per UFC 4-010-01.

3.2.8 Utilities

Minimum utility sizes and connections shown on the concept drawings in Part 6 (Attachment I) are based on information available during RFP development and are provided for preliminary cost estimating only. Final utility design and sizing must be the responsibility of the Designer of Record (DOR).

(A) Sanitary Sewer Service

The existing sanitary sewer system has exceeded its design life and must be completely replaced. Provide a minimum 10-inch sanitary sewer main between the manholes identified on the civil concept plan, including all laterals. Refer to Part 6, Attachment I Conceptual Drawings for proposed lateral locations.

(B) Water System

Fire protection water service must be provided from the existing 8-inch water main located along Terrier Avenue.

Domestic water service is currently provided by a 6” waterline. This connection is adequate and is to be retained.

Project requirements include, but are not limited to, the following:

Safe Drinking Water Act: Installation and testing of backflow prevention devices on potable water lines in accordance with the Safe Drinking Water Act. Coordinate with the Water Quality Manager, Environmental Quality Branch (EQB), or Public Works Division Operations Branch.

Reduction of Lead in Drinking Water Act (RLDWA): All piping, fittings, fixtures, solder, and flux providing water for human consumption shall be “lead-free” as defined by the RLDWA, with a weighted average lead content not exceeding 0.25 percent of wetted surfaces. Calculation methodology is available from the U.S. Environmental Protection Agency (EPA).

(C) Storm Drainage

Each of the two courtyards shall be provided with two new storm sewer inlets connected to the existing system. The courtyards must be regraded as necessary to drain to the

new and existing inlets. Based on available construction plans, the storm systems are presumed to discharge to the wetlands; however, the surveyor was unable to locate the outfalls in the field.

The Contractor must include CCTV of existing stormwater pipes to identify if pipes need to have blockages cleared or be replaced. The Contractor must include this effort in the appropriate CLIN option in the Price Schedule.

If the storm sewer system is determined to be unserviceable, new storm drainage conveyances (surface or piped) must be designed and provided for the 10-year design storm in accordance with UFC 3-201-01, Civil Engineering.

(D) Electrical

(i) Primary Electric Service

The primary electrical utility voltage is 4160V, 3-phase, 3-wire. Existing pad mounted 3-way switch (SW-2) currently serves the 2000A unit substation located in the main electrical/mechanical room at Bldg 550. The Design-Build contractor must replace the existing pad mounted switch (SW-2) with a 4-way pad mounted switch and replace the existing unit substation with an exterior pad mounted service transformer.

(ii) Lightning Protection

A lightning protection and grounding counterpoise system is required.

(iii) Exterior Lighting

This project requires exterior building mounted, walkway, and landscape lighting.

(iv) Interior Lighting

Interior lighting consists of new modern LED lighting in accordance with UFC 3-530-01 and FC 4-721-10N.

(v) Lighting Controls

Lighting Controls must be provided in accordance with UFC 3-530-01 and FC 4-721-10N.

(vi) Secondary Electric Service

Provide a secondary service via pad mounted transformer to service entrance switchboard. Utilization voltage is 208Y/120V, 3-phase, 4-wire electrical service.

(vii) Pathways

All exterior pathways for primary service and secondary service entrance must be in a concrete ductbank in accordance with 3-550-01. All interior pathways for electrical feeders and branch circuits must be in accordance with UFC 3-501-01, 3-520-01 and the National Electrical Code (Latest Edition).

(E) Telecom

(i) Outside Plant Infrastructure

A new fiber outside plant line must be provided from the nearest communications handhole servicing the new adjacent Building 534 (to the North). A conduit path must be created from the new MDF located in the Administrative Building to Building 2.

(ii) Pathways and Cabling

SM Fiber and CAT6 cable must be run utilizing the new conduit pathway from the MDF to Building 2 chases to service each room. The fiber must run through conduit

from the MDF to Buildings 1 and 3 to the new IDF spaces where CAT6 will go through conduit down the building chases to service each room.

(iii) Telecommunications Rooms

An MDF will be created on the back half of the Administrative building. IDF Telecom spaces in Buildings 1 and 3 must be vertically stacked each floor.

(iv) Backbone Cabling

The backbone fiber cabling must run from, MDF to building 1 MDF to Building 3.

(v) Horizontal Cabling

The horizontal CAT6 cables must run from, MDF to Building 2 floors 1-3 Building 1 IDF floors 1-3 to corresponding chase Building 3 IDF floors 1-3 to corresponding chase.

(vi) Security

All Telecom spaces must be provided with locking perimeter doors and locks on Cabinets within the Telecom space.

(F) District Chilled Water

The site contains 6-inch chilled water supply and return underground piping mains from the district chilled water plant on the east side of the building. The building is served by 4-inch chilled water supply and return branches from the district chilled water system. The existing 4-inch chilled water supply and return branches will be reused in accordance with the results of the life cycle cost analysis.

3.2.9 Fire Protection

The fire protection scope of the project includes providing an automatic sprinkler system and fire alarm/mass notification system as required in UFC 3-600-01. The system will report via radio to the existing base-wide Monaco system.

The existing fire alarm system will be demolished and replaced with a combined addressable fire alarm and mass notification system in accordance with UFC 4-021-01 requirements.

3.2.10 Geotechnical Earthwork Requirements

All geotechnical earthwork for this project must be executed in accordance with Unified Facilities Criteria (UFC), Unified Facilities Guide Specifications (UFGS), and relevant ASTM standards. Earthwork shall support all proposed structures, pavements, utilities, and associated site improvements as outlined in the contract documents.

(A) Existing Building Foundations and Demolition

The project site includes existing buildings, some of which may or may not be scheduled for demolition. The following requirements apply:

(i) Building Demolition:

Existing structures designated for removal must be demolished in accordance with contract drawings and specifications. All structural elements, including slabs, footings, grade beams, and pile caps, must be removed to a depth of at least 600 mm (2 feet) below final subgrade, unless otherwise directed by the Contracting Officer. Any Unforeseen debris will be addressed in the price schedule.

(ii) Subsurface Obstructions:

The Contractor must identify and remove any buried construction debris, foundations, or utility remnants that may interfere with new work. The geotechnical and geophysical data report is included in Part 6 of the RFP Package, with the data report provided as Attachment K, of the Geotechnical Report.

(B) Site Preparation

Clear all designated construction areas, including removal of vegetation, topsoil, unsuitable fill, existing pavements, and debris. Proof-roll the exposed subgrade to locate soft or unstable areas requiring remediation. Unacceptable materials shall be over-excavated and replaced with compacted structural fill.

(C) Excavation

Excavation activities shall comply with EM 385-1-1 and OSHA 29 CFR 1926 Subpart P for safety. Protect all adjacent facilities and utilities. Excess or unsuitable excavated material shall be disposed of offsite in accordance with local regulations. Minimize the need for surplus soil disposal.

(D) Structural Fill and Compaction

Only approved materials shall be used as structural fill. All fill shall be placed and compacted in accordance with ASTM D698 (Standard Proctor) or ASTM D1557 (Modified Proctor). Minimum compaction criteria:

(i) Foundations, slabs, and pavement areas: 95% of maximum dry density
(ii) Non-structural areas: 90% of maximum dry density
(iii) Fill shall be placed in loose lifts not exceeding 200 mm (8 inches) and compacted to the required density. Moisture content must be within ±2% of optimum.

(E) Utility Trench Backfill

Trench backfill shall conform to UFGS 33 05 23.23 and ASTM C33. Bedding and initial backfill shall be placed in accordance with utility type and pipe material. Final backfill shall meet the same compaction requirements as surrounding subgrade.

(F) Subgrade Verification

Before construction of footings, slabs-on-grade, or pavements, schedule a subgrade inspection with a qualified geotechnical professional. The subgrade must be verified for bearing suitability. Unsuitable areas must be corrected by undercutting, recompaction, or ground improvement, as necessary.

4.0 BUILDING REQUIREMENTS

4.1 Selective Building Demolition

Building hazardous materials (HazMat) must be removed prior to demolition or, in certain cases, controlled during demolition. Building HazMat includes asbestos-containing materials (ACM), lead-containing materials (LCM), mold-impacted building materials, polychlorinated biphenyl (PCB)-contaminated building materials, and other HazMat that will require abatement, removal or management prior to construction.

(A) ACM is present in the building.
(B) Loose leaded paint is present, may pose an inhalation exposure hazard, and may contaminate soil if left in place during demolition.
(C) PCB-contaminated caulk/sealant is present on the exterior of the building.
(D) Building 550 may also contain other building HazMat including mercury-containing light tubes, gauges, and thermostats; materials with low level radioactive components such as smoke detectors and emergency exit signs, PCBs in light ballasts or electrical equipment; and ozone depleting substances found in HVAC units.
(E) Mold has also been identified in Building 550 at many locations throughout the building as well as some of the above HazMat.

A HazMat survey has been performed as part of this RFP that assessed the presence, location and quantity of building HazMat. The HazMat survey report is included as an attachment to this DB RFP (Part 6, Attachment O). The results are presented in tabular format which can form the basis of abatement schedules to be used, after field verification, by the contractor.

HazMat removal and control for this project must be executed in accordance with the contract documents, Unified Facilities Criteria (UFC), Unified Facilities Guide Specifications (UFGS), and all applicable Federal, State, and local regulations. The contractor is responsible for the development of all abatement plans, permitting, and notification requirements. The PCB abatement plan must be submitted to the installation at least 45 days prior to the start of work to allow for EPA review. Refer to specification sections 02 82 00, 02 83 00, 02 84 16, 02 84 33, and 02 85 00.

4.2 Space Tabulation

See Part 6, Attachment D for minimum space program requirements.

4.3 Exterior Character

4.3.1 Base / Body

Existing concrete masonry unit (CMU) bearing walls with prestressed concrete plank flooring to remain. The exterior envelope is brick over CMU. Open walkways are precast concrete with exposed structural steel columns and supports between pre-cast concrete panel railings. Refer to Installation Appearance Plan (IAP) Attachment Q as found in Part 6

4.3.2 Metal Trim

All frames and metal trim on doors, frames and windows to be a dark bronze color. All metal soffits to match finish of existing condition and IAP. The exposed exterior steel columns and exposed structure must be painted to match finish of existing condition and IAP. Finish color metal columns and soffits to match. Refer to IAP for acceptable colors.

4.3.3 Brick

Existing brick will remain. Entries to the sleeping rooms will be reconstructed to meet ATFP requirements and will have brick to match in scale and texture.

4.3.4 Glazing

At the administrative building all entrances, storefronts and window units are to be aluminum and comply with UFC 4-010-10.

Windows at the sleeping units will be hollow metal to match the new door frame with, insulated glazing units that comply with UFC 4-010-01. Doors with glass vision panels will be tempered insulated glazing units that comply with UFC 4-010-10.

All glass is to be tinted and include bird-collision-resistant glazing.

4.3.5 Doors

All exterior doors and frames are insulated hollow metal and painted dark bronze.

4.3.6 Roofing

All roofing replacement material to be low-slope single-ply roofing system over insulation and topping on existing concrete plank. Color to be per sustainable requirements.

4.4 Building Engineering

4.4.1 Mechanical

The existing mechanical HVAC systems are in various stages of deterioration and appear to be beyond their useful life. As such, all mechanical equipment, piping, ductwork, controls, appurtenances and accessories must be demolished completely. The existing HVAC system consists of chilled water and hot water systems serving variable air volume (VAV) air handling units with chilled water and hot water coils, and fan powered VAV terminal units with hot water reheat coils. Chilled water is provided to the building from the district chilled water plant via 4-inch supply and return piping. Chilled water is distributed throughout the building by base mounted end suction pumps. Heating hot water is generated by two natural gas fired boilers and distributed throughout the building by base mounted end suction pumps. Chilled and hot water are routed from the main mechanical room in the administrative building to the three residential buildings via underground piping. The underground chilled and hot water piping enters each building in the utility corridor where it is then distributed to equipment throughout each building. The dwelling unit bathrooms are exhausted by roof-mounted exhaust fans. The exhaust system is inadequate as it is currently configured, not providing sufficient exhaust air flow to properly exhaust the spaces and prevent mold growth.

The new mechanical systems will consist of high efficiency natural gas fired condensing boilers for generation of heating hot water, base mounted end suction pumps for distribution of chilled water and heating hot water, 4-pipe fan coil units (FCU) for space sensible cooling and heating, dedicated outside air system (DOAS) with total energy recovery for ventilation and dehumidification, and a complete direct digital control (DDC) system. The existing building HVAC system utilizes chilled water supplied to the building from the district chilled water plant. The chilled water supply from the district chilled water plant will be used for the proposed HVAC systems. DOAS supply air will be fully ducted and delivered directly to spaces at room-neutral temperatures. DOAS supply air must be cooled to a sufficiently low dew-point temperature to handle the space and ventilation air latent loads. Exhaust air from the dwelling unit bathrooms and common area restrooms will be fully ducted back to the DOAS units for energy recovery. DOAS supply and exhaust air will be extended from the core of residential buildings 1 and 3 to the adjacent common areas and will be concealed in an exterior soffit. In accordance with UFC 1-200-01, the Environmental Severity Classification for Dam Neck is C4, as such, additional corrosion protection measures are required. Mechanical rooms will be provided with air

conditioning and heating in lieu of a traditional heating and ventilation system and spaces will be sealed to prevent air leakage and infiltration. Coils are required to be provided with corrosion resistant coatings suitable for the project location.

4.4.2 Plumbing

The 36 inch wide plumbing chases found on each floor of buildings 1-3 are currently congested with equipment and piping from many utilities, leaving them impassable to support servicing equipment. One goal of the building renovation is to remove all items from the chase and reinstall new plumbing tight to the walls to provide ample clear space of 24-30 inches for maintenance personnel passage. Other disciplines require dedicated spaces for their equipment to minimize intrusion into the plumbing chases. The plumbing replacement scope is not limited to the chases – the intent is a complete removal and replacement of all plumbing and systems in all buildings. This will include all fixtures, water heaters, backflow preventers, hot/cold/recirculation piping, waste and vent piping, pumps, valves, tanks, and related appurtenances. Note that a portion of buried piping may be inaccessible due to the prestressed structural floor panels. Coordinate pipe replacement omissions with contracting officer.

Showers in all rooms currently have a side discharge drain which has historically been problematic. The intended redesign will include a prefabricated fiberglass raised floor, or a built-up tile floor, that leaves room for a center vertical shower drain and horizontal drain pipe with no floor penetration required. A side discharge drain will be retained in the ABA rooms as it permits a low shower floor, compliant with accessibility requirements. The new shower floor will be built-up to provide positive drainage to the side drain. The remaining bathroom floor in ABA units will be raised to be ¼” higher than the resulting shower floor to yield a nearly flush entrance. A shallow ramp will be required to access the raised bathroom from the living area.

4.4.3 Vertical Transportation

Based on the requirements of the UFC 3-490-06 the existing building elevator does not meet current code requirements for hoistway clearances, mechanical room size, minimum speed, or ambulance stretcher compliance. In addition, there is only a single elevator and the minimum elevator requirements for this facility is two (2) elevators.

The Contractor will provide a layout that includes two (2) elevators that are code compliant, including hoistway, mechanical room, and enclosed elevator lobbies at each floor.

4.4.4 Structural

Based on the nature of occupancy, the building is classified as a Risk Category II building.

The structural scope of work does not qualify as substantial structural alteration per IEBC. Existing structural elements may remain as is, except where an alteration causes an increase in design load of 5% or more for gravity load carrying elements, and 10% or more for lateral load carrying elements.

Contractor must evaluate live load capacity of existing floor framing where sleeping units have been converted to other use, resulting in a higher live load demand.

Structural alterations needed to accommodate work for other disciplines, such as but not limited to, floor penetrations through prestressed concrete planks, require verification that the altered structural elements have the capacity to resist the applicable design loading in accordance with IEBC 2024.

A conditions assessment report of the building is provided in Part 6, Attachment C. The report includes a description of the existing structural systems, observed structural deficiencies, and estimated quantities of repair work to be included in the base bid. The contractor must provide additional investigation to design and implement the repairs outlined in the report.

Structural deficiencies requiring repair do not qualify as substantial structural damage per IEBC. Structural elements may be repaired to their predamage condition.

Collapse Resistant Design Category A (CRDC A) has been assigned to the building in accordance with UFC 3-301-01 Table 8-1 Risk Matrix. Based on this CRDC and application of UFC 3-301-01 Figure 8-1 Existing Building Applicability, Disproportionate Collapse Mitigation is not required.

4.5 Safety System Engineering

This safety report documents the findings from a comprehensive Safety Assessment conducted for NAS Oceana Dam Neck Annex Building 550 (B550). Building 550 consists of:

- One (1) Administrative Building; and
- Three (3) separate dormitory-style, three-story buildings connected by covered walkways on all three levels.

The dormitories contain a mix of sleeping quarters, storage rooms, laundry areas, training/lounge rooms, HVAC/mechanical spaces, and utility chases that span the length of each floor.

The objective of this assessment was to identify deficiencies related to life safety, electrical systems, hazardous materials management, sanitation, confined spaces, and general OSHA compliance.

4.5.1 Administrative Building Assessment

The Administrative Building was occupied by military personnel during the walkthrough and serves as the primary administrative hub for housing coordination. Several safety concerns were identified and are noted below.

(A) Non-Illuminated EXIT Signs

Multiple interior office doors lacked illuminated EXIT signage.

(i) Applicable Standards:
- OSHA 29 CFR 1910 Subpart E – Exit Routes and Emergency Planning
- 1910.35 (Compliance with alternate exit-route codes)
- 1910.38 (Emergency Action Plans)
- 1910.39 (Fire Prevention Plans)

(B) Improper Chemical Storage

Cleaning chemicals were stored together in an open closet without required Safety Data Sheets (SDS) available on-site.

(i) Applicable Standards:
- OSHA 29 CFR 1910 Subpart H – Hazardous Materials (SDS Requirements)

(C) Improper Electrical Use — Overloaded Power Strips

High-wattage appliances (refrigerators, microwaves) were connected to standard, consumer-grade power strips not rated for the load.

(i) Applicable Standards:
- 1910.304 (Wiring Design and Protection)
- 1910.306 (Specific-Purpose Equipment)
- 1910.335 (Safeguards for Personal Protection)

(ii) Supporting Guidance:
- OSHA Letter of Interpretation, *"Compliance Requirements for Relocatable Power Taps (Power Strips)"* dated November 18, 2002.

4.5.2 Dormitory Buildings Assessment

Safety-related issues were largely consistent across Dormitory Buildings 1, 2, and 3. All findings are supported by photographic documentation. Common safety deficiencies are noted below.

(A) Mold Growth in Dorm Rooms & Laundry Areas

Mold of unspecified type was observed on walls, ceilings, and in multiple rooms.

(i) Applicable Standard:
- OSHA 29 CFR 1910 Subpart Z – Toxic and Hazardous Substances

(B) Improper Electrical Use — Overloaded Power Strips

High-wattage appliances (mini-fridges, microwaves) connected to standard power strips.

(i) Applicable Standard:
- 1910.304 – Electrical Wiring (Design & Protection)

(C) Uncovered Electrical Receptacles

Multiple wall outlets were uncovered or missing protective plates.

(i) Applicable Standard:
- 1910.304 – Electrical Wiring (Design & Protection)

(D) Improper Chemical Storage

Unlabeled or inadequately segregated chemicals were found in various storerooms.

(i) Applicable Standard:
- 1910 Subpart H – Hazardous Materials (Chemical Labeling Requirements)

(E) Exposed Insulation & Mold in HVAC/Mechanical Rooms

Exposed insulation and mold growth observed in several mechanical spaces.

(i) Applicable Standard:
- 1910.141 – Sanitation Requirements

(F) Potential Confined Spaces — Underground Vaults

Unmarked underground vaults behind Dorm Buildings 1 and 3 appear to meet the definition of confined spaces.

(i) Applicable Standard:
- 1910.146 – Permit-Required Confined Spaces

(G) 3.1.7 Non-Functioning Elevator & Stairway Deficiencies

Elevator system was inoperative; stairs had structural and safety concerns that restrict access to upper floors.

(i) Applicable Standard:
- 1917.116 – Elevators and Escalators

(H) Exposed Piping with Missing Insulation

Piping lacked insulation, presenting potential hot-surface exposure risk.

(i) Applicable Standard:
- ANSI/ASME A13.1 – Pipe Marking & Identification Standard

4.5.3 Dormitory Building 3 — Specific Findings

(A) 4.1 Locked Flammable Storage Cabinets

Two (2) locked flammable storage cabinets are located behind Building 3. Keys were not available, and cabinet contents could not be verified.

(i) Applicable Standard:
- 1910.106 – Flammable Liquids (Storage Requirements)

4.5.4 Chase Ways Assessment

Utility chase ways were assessed across all three dormitory levels. The following safety deficiencies were identified.

(A) Exposed Wiring & Open Electrical Junction Boxes

Multiple instances of open junction boxes and exposed wiring were observed.

(i) Applicable Standards:
- 1910.304 – Electrical Wiring (Design & Protection)
- 1910.306 – Specific-Purpose Equipment
- 1910.335 – Personal Protection Safeguards

(B) Unlabeled or Open Electrical Panels

Panels lacked labeling and in some cases were left open without barriers.

(i) Applicable Standards:
- 1910.304
- 1910.306
- 1910.335

(C) Exposed Insulation of Unknown Type/Condition

The conditions observed insulation could not be verified and may pose health or heat-contact hazards.

(i) Applicable Standard:
- 1910.261(k)(11) – Steam and Hot-Water Pipe Requirements

4.6 Telecommunications

The approach to bring the telecom spaces up to modern UFC code will include adding an MDF room to the administration building that will also service building 2. Vertically stacked IDF Telecom spaces will be added to buildings 1 and 3 and connect back to the MDF.

4.7 Audio-Visual

These systems will support the command and all associated teams in a forward-thinking, effective, and efficient manner. This will be achieved through the deployment of technology that meets—and where possible, exceeds—current mission requirements. The technology will follow the local, Navy and/or other specified codes and standards for low and high-side signal transportation. This, for example, will include the use of devices designed and manufactured to be Trade Agreements Act (TAA) compliant.

4.7.1 Administrative Private Offices

The rooms will be equipped with a single UHD 4K flat-panel display mounted on the wall using a low-profile mount with pull-out and tilt functionality. The mount will be installed over a recessed

display backbox containing surge protection and a quad electrical outlet. Mounted behind the monitor there will be a TAA-compliant digital signage decoder to enable network-based content playback and distribution to the room displays as part of the facility's enterprise signage and information system.

4.7.2 Administrative Office

The rooms will be equipped with a single UHD 4K flat-panel display mounted on the wall using a low-profile mount with pull-out and tilt functionality. The mount will be installed over a recessed display backbox containing surge protection and a quad electrical outlet. Mounted behind the monitor there will be a TAA-compliant digital signage decoder to enable network-based content playback and distribution to the room displays as part of the facility's enterprise signage and information system.

4.7.3 Building Manager

The room will be equipped with a single UHD 4K flat-panel display mounted on the wall using a low-profile mount with pull-out and tilt functionality. The mount will be installed over a recessed display backbox containing surge protection and a quad electrical outlet. Mounted behind the monitor there will be a TAA-compliant digital signage decoder to enable network-based content playback and distribution to the room displays as part of the facility's enterprise signage and information system.

4.7.4 Maintenance Office

The room will be equipped with a single UHD 4K flat-panel display mounted on the wall using a low-profile mount with pull-out and tilt functionality. The mount will be installed over a recessed display backbox containing surge protection and a quad electrical outlet. Mounted behind the monitor there will be a TAA-compliant digital signage decoder to enable network-based content playback and distribution to the room displays as part of the facility's enterprise signage and information system.

4.7.5 Enlisted Private Office

The rooms will be equipped with a single UHD 4K flat-panel display mounted on the wall using a low-profile mount with pull-out and tilt functionality. The mount will be installed over a recessed display backbox containing surge protection and a quad electrical outlet. Mounted behind the monitor there will be a TAA-compliant digital signage decoder to enable network-based content playback and distribution to the room displays as part of the facility's enterprise signage and information system.

4.7.6 Training Room

The Training room will be equipped with dual large-format UHD 4K flat-panel displays mounted on the wall at the head of the table using low-profile mounts with pull-out and tilt functionality. The mounts will be installed over recessed display backboxes containing surge protection and quad electrical outlets. A unified communications (UC) all-in-one camera system with integrated speakers and microphone array will support Microsoft Teams conferencing. A graphics input and a small touch panel will be provided for room interaction and basic system control. A small removable Audio-Visual credenza with casters and provisions for heat dissipation will house the support equipment. Mounted behind each monitor there will be a TAA-compliant digital signage decoder to enable network-based content playback and distribution to the room displays as part of the facility's enterprise signage and information system.

4.7.7 Lobby

The rooms will be equipped with a single UHD 4K flat-panel display mounted on the wall using a low-profile mount with pull-out and tilt functionality. The mount will be installed over a recessed display backbox containing surge protection and a quad electrical outlet. Mounted behind the

monitor there will be a TAA-compliant digital signage decoder to enable network-based content playback and distribution to the room displays as part of the facility's enterprise signage and information system.

4.7.8 Lounges

The Lounge rooms will be equipped with a large-format UHD 4K flat-panel display mounted on the wall at the head of the table using low-profile mounts with pull-out and tilt functionality. The mounts will be installed over recessed display backboxes containing surge protection and quad electrical outlets. A unified communications (UC) all-in-one camera system with integrated speakers and microphone array will support Microsoft Teams conferencing but should be confirmed. A graphics input and a small touch panel will be provided for room interaction and basic system control. A small removable Audio-Visual credenza with casters and provisions for heat dissipation will house the support equipment. Mounted behind each monitor there will be a TAA-compliant digital signage decoder to enable network-based content playback and distribution to the room displays as part of the facility's enterprise signage and information system.

4.7.9 AV rooms

The intent of the AV Rooms is to support the equipment for each floor and surrounding rooms and infrastructure for a multi-building digital signage system. A robust, centrally managed, TAA-compliant platform capable of delivering UHD content to designated displays with minimal local intervention. The system is designed to be flexible enough to accommodate future expansion and evolving content needs.

The facility will be provided with an enterprise digital signage system to support the distribution of informational, training, and administrative content to designated displays throughout the building. The system will be centrally managed, network-based, and scalable to support future expansion. Content will be distributed over a facility data network and displayed locally at each signage endpoint.

Digital signage playback at each display location will be supported by digital signage decoders. The decoders will be TAA-compliant and capable of supporting UHD 4K content output suitable for large-format flat-panel displays. Decoders will be installed locally at each designated signage display and will interface with the display via HDMI or equivalent digital video connection. Each decoder will support network-based content delivery, scheduled playback, and centralized management as part of the overall signage system architecture.

Where required, an infrared control interface will be provided to support local display power control and basic display functions. These interfaces will allow signage content playback to be coordinated with display operational states and support unattended operation.

A centralized digital signage server platform will be provided to support content management, scheduling, distribution, and system monitoring. The server will be implemented as a physical platform, subject to final design coordination and location with the facility IT and cybersecurity stakeholders.

Final server sizing, storage capacity, and licensing quantities will be confirmed during subsequent design phases based on the number of signage endpoints and content requirements.

Detailed network architecture and security implementation will be developed during the 60% and 90% design phases.

At the 35% design phase, the location and staffing model for digital signage system operation and content creation have not been defined. It is assumed that system operators and content designers may be located within an operations center, administrative workspace, or other Owner-designated area. Final requirements will be validated through coordination with the Owner and ICT team during the 60% and 90% design phases.

A unified communications (UC) all-in-one camera system with integrated speakers and microphone array that supports Microsoft Teams conference will need a GFE computer that is connected to the Government Training network.

4.8 Interior Character

The interior of the building will be designed with performance, health and wellness, sustainability, and aesthetics in mind. Finishes and materials will be selected for durability, maintainability, budget-friendliness, acoustics, proper light reflectance, slip resistance, and ergonomic properties.

4.8.1 Administration

Repair and smooth existing plaster and finish with high performance paint. Provide new walls with high performance painted gypsum wallboard. Flooring will be luxury vinyl tile with rubber base. Exterior windows to receive light filtering roller shades.

4.8.2 Public Spaces

(A) **Lobby:** Provide high performance painted gypsum wallboard. Flooring will be a color body porcelain tile with coved base to match the floor tile. The ceiling will be an acoustic ceiling tile with gypsum board surrounding soffits to center acoustic ceiling tiles on seating.

(B) **Restrooms:** Walls will have floor to ceiling, color body tiled wall with rectified edges. Flooring will be a color body porcelain tile. Repair and smooth existing plaster ceilings and finish with epoxy paint.

(C) **Lounge and Vending:** Repair and smooth existing plaster walls and ceilings and finish with high performance paint. Provide new walls with high performance painted gypsum wallboard. Flooring will be luxury vinyl tile with rubber base. Exterior windows receive dual roller shades with light filtering and black out shades.

(D) **Laundry:** Repair and smooth existing CMU walls and finish with epoxy paint. Flooring to be a color body porcelain tile with coved base to match the floor tile. Repair and smooth existing plaster ceilings and finish with epoxy paint.

4.8.3 Storage, Janitor’s Closet and Housekeeping

Repair and smooth existing plaster ceilings and walls and finish with high performance paint. Provide new walls with high performance painted gypsum wallboard. Flooring will be sealed concrete with rubber wall base. Repair and smooth concrete to provide smooth surface. Provide Fiber Reinforced Panels (FRP) on walls behind the mop sink in janitor’s closet and housekeeping.

4.8.4 Barracks

Repair and smooth existing plaster ceilings and walls and finish with high performance paint. Provide new walls with high performance painted gypsum wallboard. Flooring will be luxury vinyl tile with rubber base. Exterior windows receive dual roller shades with light filtering and black out shades.

(A) **Restrooms:** Walls will have floor to ceiling color body tile with rectified edges. Flooring to be a color body porcelain tile. Showers will be seamless (except at corners) floor to ceiling solid surface surround with solid surface shower pan. Provide gypsum wall board ceiling finished with epoxy paint.

4.8.5 Building Support (Comms, Electrical, Mechanical, Plumbing, and Fire Protection)

Repair and smooth existing walls and ceilings and finish with epoxy paint. Flooring will be sealed concrete with rubber wall base.

5.0 ROOM REQUIREMENTS

6.0 ENGINEERING SYSTEMS REQUIREMENTS

A10 Foundations
A20 Basement Construction
B10 Superstructure
B20 Exterior Enclosure
B30 Roofing
C10 Interior Construction
C20 Stairs
C30 Interior Finishes
D10 Conveying
D20 Plumbing
D30 HVAC
D40 Fire Protection
D50 Electrical
E10 Equipment
E20 Furnishings
F20 Selective Building Demolition
G10 Site Preparation
G20 Site Improvements
G30 Site Civil/Mechanical Utilities
G40 Site Electrical Utilities

5.0 ROOM REQUIREMENTS

5.0 ROOM REQUIREMENTS

1.1 Administrative Private Office

Space Characteristics

Function/adjacencies:

Private office for managing personnel for the administrative department. This room has a primary adjacency to the administrative open office with three staff.
Room Data Sheet applies to Room Number(s): 127A

Special Dimensions:

Ideal Plan Dimensions: 10'-0" W x 12'-0" D (120 sq ft min)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: 1

FF&E Information for Coordination:

FF&E and AV Equipment will be funded separately as a bid option to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design Workship (CDW). Space will accommodate, at a minimum, the following:

FF&E: Provide 72" x 114" L-shaped plastic laminate height adjustable desk with full modesty panel on front desk, no modesty panel on wall, furniture mounted overheads, tackable/magnetic panel, wardrobe, and filing. Provide task chair. Provide (2) visitor chairs with wooden legs and glides. Provide personal trash and recycling bin.

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
B203001	Solid Doors	1	3' W x 7' H	Exterior hollow metal door and frame.
C102007.I	Interior Door Hardware	1	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103003	Marker Boards and Tack Boards	1	36" W x 48" D	Provide markerboard(s).
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301002	Plaster Wall Finishes	-	-	Repair and smooth existing plaster. High performance paint.
C301003	Gypsum Wallboard Finishes	-	-	High-performance painted GWB.
C302004	Resilient Floor Finishes	-	Plank Tile	Provide water-resistant luxury vinyl tile. Length to be at least 3 times the width.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C303003	Plaster Ceiling Finishes	-	-	Repair and smooth existing plaster ceilings. High performance paint.
D30	HVAC	-	-	Provide heating, ventilation, exhaust, and air conditioning, including all required control systems and devices, for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.

D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. The design drawings must conform to UFC 3-520-01.
D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures and automatic control, and emergency lighting. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.
D503001.A	Work Area Outlet - Unclassified	2	-	Provide two (2) Category 6A Cabling Drops to Outlet (Includes conduit, box, cabling, jacks, etc.)
E102009	Audiovisual Equipment	1	As Required	Provide a local CATV or IPTV connection.
E201002	Window Treatments	-	-	Provide light filtering roller shades at exterior windows.

5.0 ROOM REQUIREMENTS

1.2 Administrative Office

Space Characteristics

Function/adjacencies:

Open office for 3 personnel with a primary adjacency with the administrative private office.
Room Data Sheet applies to Room Number(s): 127

Special Dimensions:

Ideal Plan Dimensions: 20'-0" W x 11'-9" D (235 sq ft)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: 3

FF&E Information for Coordination:

FF&E and AV Equipment will be funded separately as a bid option to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design Workship (CDW). Space will accommodate, at a minimum, the following:

FF&E: Provide modular systems furniture with height adjustable desk, wardrobe, and box/file storage for each occupant. Provide cubicle wall height of 50" (+/- 3") with gallery panels where power is not required. Provide (1) task chair for each occupant. Provide lateral file(s) where space permits. Provide (1) personal trash and recycling bin for each occupant.

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
B203001	Solid Doors	1	3' W x 7' H	Exterior hollow metal door and frame.
B203008.E	Exterior Door Hardware	1	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103003	Marker Boards and Tack Boards	1	36" W x 48" D	Provide markerboard(s).
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301002	Plaster Wall Finishes	-	-	Repair and smooth existing plaster. High performance paint.
C301003	Gypsum Wallboard Finishes	-	-	High-performance painted GWB.
C302004	Resilient Floor Finishes	-	Plank Tile	Provide water-resistant luxury vinyl tile. Length to be at least 3 times the width.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C303003	Plaster Ceiling Finishes	-	-	Repair and smooth existing plaster ceilings. High performance paint.
D30	HVAC	-	-	Provide heating, ventilation, exhaust, and air conditioning, including all required control systems and devices, for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.

D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. The design drawings must conform to UFC 3-520-01.
D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures and automatic control, and emergency lighting. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.
D503001.A	Work Area Outlet - Unclassified	3	-	Provide two (2) Category 6A Cabling Drops to Outlet (Includes conduit, box, cabling, jacks, etc.)
E102009	Audiovisual Equipment	1	As Required	Provide a local CATV or IPTV connection.
E1040	Government Furnished Equipment	1	-	Provide floor space for a multifunction device.

5.0 ROOM REQUIREMENTS

1.3 Building Manager

Space Characteristics

Function/adjacencies:

Private office for the building manager. Primary adjacency to the parking lot.
Room Data Sheet applies to Room Number(s): 111

Special Dimensions:

Ideal Plan Dimensions: 10'-0" W x 10'-0" D (100 sq ft min)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: 1

FF&E Information for Coordination:

FF&E and AV Equipment will be funded separately as a bid option to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design Workship (CDW). Space will accommodate, at a minimum, the following:

FF&E: Provide modular systems furniture with height adjustable desk, wardrobe, and box/file storage. Provide cubicle wall height of 50" (+/- 3") with gallery panels where power is not required. Provide (1) task chair. Provide (2) guest chairs. Provide lateral file where space permits. Provide personal trash and recycling bin.

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
C102001.A	Standard Interior Doors	1	3' W x 7' H	Provide a solid core wood door.
B203008.E	Exterior Door Hardware	-	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103003	Marker Boards and Tack Boards	1	36" W x 48" D	Provide markerboard(s).
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301002	Plaster Wall Finishes	-	-	Repair and smooth existing plaster. High performance paint.
C302004	Resilient Floor Finishes	-	Plank Tile	Provide water-resistant luxury vinyl tile. Length to be at least 3 times the width.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C303003	Plaster Ceiling Finishes	-	-	Repair and smooth existing plaster ceilings. High performance paint.
D30	HVAC	-	-	Provide heating, ventilation, exhaust, and air conditioning, including all required control systems and devices, for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.

D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. The design drawings must conform to UFC 3-520-01.
D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures and automatic control, and emergency lighting. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.
D503001.A	Work Area Outlet - Unclassified	2	-	Provide two (2) Category 6A Cabling Drops to Outlet (Includes conduit, box, cabling, jacks, etc.)
E102009	Audiovisual Equipment	1	As Required	Provide a local CATV or IPTV connection.
[redacted]				

5.0 ROOM REQUIREMENTS

1.4 Maintenance Office

Space Characteristics

Function/adjacencies:

Shared office for 2 people with open office style workstations. Primary adjacency to maintenance storage.
Room Data Sheet applies to Room Number(s): 219

Special Dimensions:

Ideal Plan Dimensions: 20'-0" W x 10'-0" D (200 sq ft)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: 2

FF&E Information for Coordination:

FF&E and AV Equipment will be funded separately as a bid option to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design Workship (CDW). Space will accommodate, at a minimum, the following:

FF&E: Provide modular systems furniture with height adjustable desk, wardrobe, and box/file storage for each occupant. Provide cubicle wall height of 50" (+/- 3") with gallery panels where power is not required. Provide (1) task chair for each occupant. Provide lateral file(s) where space permits. Provide (1) personal trash and recycling bin for each occupant.

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
B202001	Windows	1	5'-4"W x 6' H	Provide window.
B203001	Solid Doors	1	3' W x 7' H	Exterior hollow metal door and frame.
B203008.E	Exterior Door Hardware	1	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103003	Marker Boards and Tack Boards	1	36" W x 48" D	Provide markerboard(s).
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301002	Plaster Wall Finishes	-	-	Repair and smooth existing plaster. High performance paint.
C301003	Gypsum Wallboard Finishes	-	-	High-performance painted GWB.
C302004	Resilient Floor Finishes	-	Plank Tile	Provide water-resistant luxury vinyl tile. Length to be at least 3 times the width.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C303003	Plaster Ceiling Finishes	-	-	Repair and smooth existing plaster ceilings. High performance paint.
D30	HVAC	-	-	Provide heating, ventilation, exhaust, and air conditioning, including all required control systems and devices, for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.

D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. The design drawings must conform to UFC 3-520-01.
D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures and automatic control, and emergency lighting. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.
D503001.A	Work Area Outlet - Unclassified	2	-	Provide two (2) Category 6A Cabling Drops to Outlet (Includes conduit, box, cabling, jacks, etc.)
E102009	Audiovisual Equipment	1	As Required	Provide a local CATV or IPTV connection.
E201002	Window Treatments	-	-	Provide light filtering roller shades at exterior windows.

5.0 ROOM REQUIREMENTS

1.5 Enlisted Private Office

Space Characteristics

Function/adjacencies:

Private office for managing personnel for the enlisted department. This room has a primary adjacency to the enlisted open office with three staff.

Room Data Sheet applies to Room Number(s): 128A

Special Dimensions:

Ideal Plan Dimensions: 10'-0" W x 12'-0" D (120 sq ft min)

Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: 1

FF&E Information for Coordination:

FF&E and AV Equipment will be funded separately as a bid option to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design Workship (CDW). Space will accommodate, at a minimum, the following:

FF&E: Provide 72" x 114" L-shaped plastic laminate height adjustable desk with full modesty panel on front desk, no modesty panel on wall, furniture mounted overheads, tackable/magnetic panel, wardrobe, and filing. Provide task chair. Provide (2) wood leg visitor chairs with glides. Provide personal trash and recycling bin.

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
B202001	Windows	1	5'-4"W x 6' H	Provide window.
C102001.A	Standard Interior Doors	1	3' W x 7' H	Provide a solid core wood door.
C102007.I	Interior Door Hardware	1	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103003	Marker Boards and Tack Boards	1	36" W x 48" D	Provide markerboard(s).
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301002	Plaster Wall Finishes	-	-	Repair and smooth existing plaster. High performance paint.
C301003	Gypsum Wallboard Finishes	-	-	High-performance painted GWB.
C302004	Resilient Floor Finishes	-	Plank Tile	Provide water-resistant luxury vinyl tile. Length to be at least 3 times the width.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C303003	Plaster Ceiling Finishes	-	-	Repair and smooth existing plaster ceilings. High performance paint.
D30	HVAC	-	-	Provide heating, ventilation, exhaust, and air conditioning, including all required control systems and devices, for temperature control.

D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. The design drawings must conform to UFC 3-520-01.
D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures and automatic control, and emergency lighting. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.
D503001.A	Work Area Outlet - Unclassified	3	-	Provide two (2) Category 6A Cabling Drops to Outlet (Includes conduit, box, cabling, jacks, etc.)
E102009	Audiovisual Equipment	1	As Required	Provide a local CATV or IPTV connection.
E201002	Window Treatments	-	-	Provide light filtering roller shades at exterior windows.

5.0 ROOM REQUIREMENTS

1.6 Enlisted Open Office

Space Characteristics

Function/adjacencies:

Open office for 3 personnel with a primary adjacency with the enlisted private office.
Room Data Sheet applies to Room Number(s): 128

Special Dimensions:

Ideal Plan Dimensions: 20'-0" W x 11'-9" D (235 sq ft)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: 3

FF&E Information for Coordination:

FF&E and AV Equipment will be funded separately as a bid option to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design Workship (CDW). Space will accommodate, at a minimum, the following:

FF&E: Provide modular systems furniture with height adjustable desk, wardrobe, and box/file storage for each occupant. Provide cubicle wall height of 50" (+/- 3") with gallery panels where power is not required. Provide (1) task chair for each occupant. Provide lateral file(s) where space permits. Provide (1) personal trash and recycling bin for each occupant.

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
B202001	Windows	1	5'-4"W x 6' H	Provide window.
B203001	Solid Doors	1	3' W x 7' H	Exterior hollow metal door and frame.
B203008.E	Exterior Door Hardware	1	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103003	Marker Boards and Tack Boards	1	36" W x 48" D	Provide markerboard(s).
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301002	Plaster Wall Finishes	-	-	Repair and smooth existing plaster. High performance paint.
C301003	Gypsum Wallboard Finishes	-	-	High-performance painted GWB.
C302004	Resilient Floor Finishes	-	Plank Tile	Provide water-resistant luxury vinyl tile. Length to be at least 3 times the width.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C303003	Plaster Ceiling Finishes	-	-	Repair and smooth existing plaster ceilings. High performance paint.
D30	HVAC	-	-	Provide heating, ventilation, exhaust, and air conditioning, including all required control systems and devices, for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.

D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. The design drawings must conform to UFC 3-520-01.
D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures and automatic control, and emergency lighting. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.
D503001.A	Work Area Outlet - Unclassified	4	-	Provide two (2) Category 6A Cabling Drops to Outlet (Includes conduit, box, cabling, jacks, etc.)
E1040	Government Furnished Equipment	1	-	Provide floor space for a multifunction device.
E201002	Window Treatments	-	-	Provide light filtering roller shades at exterior windows.

5.0 ROOM REQUIREMENTS

1.7 Duty Office

Space Characteristics

Function/adjacencies:

Private office for the duty officer. Primary adjacency to the front desk and lobby. Existing room to remain. New finishes and Room Data Sheet applies to Room Number(s): 103

Special Dimensions:

Ideal Plan Dimensions: 7'-6" W x 21'-2" D (156 sq ft)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: 1

FF&E Information for Coordination:

FF&E and AV Equipment will be funded separately as a bid option to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design Workship (CDW). Space will accommodate, at a minimum, the following:

FF&E: Provide modular systems furniture with height adjustable desk, wardrobe, and box/file storage. Provide (1) task chair. Provide (2) guest chairs. Provide lateral file and storage cabinets where space permits. Provide personal trash and recycling bin.

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
B203002.A	Glazed Doors	1	3'Wx7'H	Exterior storefront single door and frame
B203008.A	Exterior Door Hardware	-	-	Provide exterior storeroom lockset.
C102001.A	Standard Interior Doors	1	3' W x 7' H	Provide a solid core wood door.
C102007.I	Interior Door Hardware	1	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103003	Marker Boards and Tack Boards	1	36" W x 48" D	Provide markerboard(s).
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301003	Gypsum Wallboard Finishes	-	-	High-performance painted GWB.
C302004	Resilient Floor Finishes	-	Plank Tile	Provide water-resistant luxury vinyl tile. Length to be at least 3 times the width.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C303001	Acoustical Ceiling Tiles and Panels	-	24" X 24" Tile	Provide acoustical ceiling tiles.
C303005	Suspension Systems	-	15mm “T” Grid	Provide 15mm factory finished metal “T” grid for 24" X 24" ACT.
D30	HVAC	-	-	Provide heating, ventilation, exhaust, and air conditioning, including all required control systems and devices, for temperature control.

D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. The design drawings must conform to UFC 3-520-01.
D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures and automatic control, and emergency lighting. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.
D503001.A	Work Area Outlet - Unclassified	2	-	Provide two (2) Category 6A Cabling Drops to Outlet (Includes conduit, box, cabling, jacks, etc.)
E102009	Audiovisual Equipment	1	As Required	Provide a local CATV or IPTV connection.

5.0 ROOM REQUIREMENTS

1.8 Training

Space Characteristics

Function/adjacencies:

A training room to conduct regular training with VTC control and facilitator station. Provide on the first floor with doors swinging in the means of egress.
Room Data Sheet applies to Room Number(s): 170

Special Dimensions:

Ideal Plan Dimensions: 49'-3" W x 20'-0" D (983 sq ft min)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: 36 (tables) - 65 (chairs)

FF&E Information for Coordination:

FF&E and AV Equipment will be funded separately as a bid option to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design Workship (CDW). Space will accommodate, at a minimum, the following:

FF&E: Provide (12) 30"x60" nesting tables and (60) nesting chairs with casters. Provide (1) lectern on casters. Provide waste receptacles. Provide credenza for AV equipment.
AV: Provide flat screen display with in-wall mount. Provide signal wall plate for local computer and a local CATV or IPTV

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
B202001	Windows	2	5'-4"W x 6' H	Provide window.
B203001	Solid Doors	1	3' W x 7' H	Exterior hollow metal door and frame.
B203008.E	Exterior Door Hardware	1	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103003	Marker Boards and Tack Boards	1	36" W x 48" D	Provide markerboard(s).
C103003.A	Marker Boards and Tack Boards	1	36" W x 48" D	Provide tackboard(s).
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301002	Plaster Wall Finishes	-	-	Repair and smooth existing plaster. High performance paint.
C302004	Resilient Floor Finishes	-	Plank Tile	Provide water-resistant luxury vinyl tile. Length to be at least 3 times the width.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C303003	Plaster Ceiling Finishes	-	-	Repair and smooth existing plaster ceilings. High performance paint.
D201006	Drinking Fountains and Coolers	1	-	Provide bi-level electric water cooler with bottle filler.
D30	HVAC	-	-	Provide heating, ventilation, exhaust, and air conditioning, including all required control systems and devices, for temperature control.

D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. The design drawings must conform to UFC 3-520-01.
D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures and automatic control, and emergency lighting. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.
D503001.A	Work Area Outlet - Unclassified	40	-	Provide two (2) Category 6A Cabling Drops to Outlet (Includes conduit, box, cabling, jacks, etc.)
D503001.G	Work Area Outlet - Wireless	6	-	Provide two (2) Category 6A Cabling Drops to or above Ceiling Outlet (Includes conduit, box, cabling, jacks, etc.)
E102009	Audiovisual Equipment	2	As Required	Provide a local CATV or IPTV connection.
E201002.A	Window Treatments	-	-	Provide double roller shade with both light filtering and black out applications.

5.0 ROOM REQUIREMENTS

1.9 Unisex Restroom

Space Characteristics

Function/adjacencies:

ABA compliant unisex restroom to serve administration, maintanance, and enlisted personnel.Primary adjacency to administration department, maintenance department, and enlisted department offices.
Room Data Sheet applies to Room Number(s): 219D

Special Dimensions:

Ideal Plan Dimensions: 9'-0" W x 9'-0" D (81 sq ft min)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Privacy lockset with occupancy indicator

Number of Occupants: n/a

FF&E Information for Coordination:

FF&E and AV Equipment will be funded separately as a bid option to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design Workship (CDW). Space will accommodate, at a minimum, the following:

FF&E: Provide waste bin.

Other/Special Requirements:

Restrooms shall be sized in accordance with the International Building Code (IBC) and UFC 3-420-01 Plumbing Systems. Design to be ABA complaint.

Uniformat Section	Description	Qty	Size	Specific Requirements
B203001	Solid Doors	1	3' W x 7' H	Exterior hollow metal door and frame.
B203008.C	Exterior Door Hardware	-	-	Provide privacy lockset with occupancy indicator.
C102001.A	Standard Interior Doors	1	3' W x 7' H	Provide a solid core wood door.
C102007.E	Interior Door Hardware	-	-	Provide privacy lockset with occupancy indicator.
C103002.B	Toilet and Bath Accessories	1	-	Provide stainless steel towel dispenser, soap dispenser, sanitary napkin bin, dual toilet paper dispenser, ABA grab bars, wall mounted mirror above sink, and a double coat hook.
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301004	Tile and Terrazzo Wall Finishes	-	-	Provide floor to ceiling, color body tiled wall with rectified edges. Provide epoxy grout joints 1/8" or less. Provide metal transition and corner strips.
C302001	Tile Floor Finishes	-	12" x 24" Tile	Provide color body porcelain floor tile with rectified edges. Provide epoxy grout joints 1/8” or less.
D201001.A	Water Closets	1	-	Provide floor mounted, back outlet ABA water closet with electronic flush valve. White color and include elongated bowl, closed seat, and lid.
D201003	Lavatories	1	-	Provide wall mounted ABA lavatory with washerless automatic control faucet.

D202001	Pipes and Fittings	-	-	Install new hot and cold piping and fittings to serve new fixtures.
D202002	Valves & Hydrants	-	-	Provide isolation and shut-off valves, provide hose bibbs or wall hydrants where required.
D202004	Insulation & Identification	-	-	Install new supply piping insulation and identification tags where required.
D203001	Waste Pipe & Fittings	-	-	Install new waste piping to serve new fixtures.
D203002	Vent Pipe and Fittings	-	-	Install new vent piping to serve new fixtures.
D203003	Floor Drains	1	-	Provide floor drain.
D30	HVAC	-	-	Provide heating, ventilation, exhaust, and air conditioning, including all required control systems and devices, for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. The design drawings must conform to UFC 3-520-01.
D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures and automatic control, and emergency lighting. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.

5.0 ROOM REQUIREMENTS

2.1 Lobby

Space Characteristics

Function/adjacencies:

Adjacent to pulbic restrooms. Existing room to remain. New finishes and FF&E.
Room Data Sheet applies to Room Number(s): 101

Special Dimensions:

Ideal Plan Dimensions: 47'-5" W x 22'-6" D (890 sq ft min)
Minimum Ceiling Height: 9'-0" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: Seating for 21

FF&E Information for Coordination:

FF&E and AV Equipment will be funded separately as a bid option to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design Workship (CDW). Space will accommodate, at a minimum, the following:

FF&E: Provide mixture of sofas, love seats, and chairs with seating for 21 at one time. Provide occasional and side tables. Provide window treatments for exterior windows.

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
B202002	Storefronts	1	5' W x 7' H	Exterior aluminum framed and glazed storefront double doors with adjacent glazed sidelights and transome.
B202090.A	Storefront Glazing Units	1	3'-4"Wx8'-7-7/8"	Exterior aluminum framed and glazed storefront window units (to fit existing openings)
B203008.E	Exterior Door Hardware	-	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103003.B	Marker Boards and Tack Boards	1	36"H x 48"W	Provide display case with tempered glass and locked door.
C103004.A	Identifying Devices	-	-	Provide wayfinding and life safety signage complying with UFC 3 120 01.
C103014	Entrance Floor Grilles and Mats	-	-	Provide losse lay floor mats at entrances to lobby.
C301003	Gypsum Wallboard Finishes	-	-	High-performance painted GWB.
C301005	Wall Coverings	-	-	Provide corner guards.
C302001	Tile Floor Finishes	-	12" x 24" Tile	Provide color body porcelain floor tile with rectified edges. Provide epoxy grout joints 1/8” or less.
C302007.A	Wall Base Finishes	-	4" Cove	Provide color body porcelain tile coved base to match floor tile.
C303001	Acoustical Ceiling Tiles and Panels	-	24" X 24" Tile	Provide acoustical ceiling tiles.
C303005	Suspension Systems	-	15mm “T” Grid	Provide 15mm factory finished metal “T” grid for 24" X 24" ACT.
D201006	Drinking Fountains and Coolers	1	-	Provide bi-level electric water cooler with bottle filler.

D202005	Specialties	1	-	Provide commercial ice machine connection.
D30	HVAC	-	-	Provide heating, ventilation, exhaust, and air conditioning, including all required control systems and devices, for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. The design drawings must conform to UFC 3-520-01.
D502002	Lighting Equipment	-	-	Provide LED lighting fixtures and automatic control. Emergency lighting fixtures via battery pack or central lighting inverter. Lighting solution and fixture aesthetics in this space must be coordinated with the Government. The design drawings must conform to UFC 3-530-01.
D503001.G	Work Area Outlet - Wireless	4	-	Provide two (2) Category 6A Cabling Drops to or above Ceiling Outlet (Includes conduit, box, cabling, jacks, etc.)
E102009	Audiovisual Equipment	1	As Required	Provide a local CATV or IPTV connection.
E1040.A	Government Furnished Equipment	1	-	Provide floor space for a ice maker.
E201002	Window Treatments	-	-	Provide light filtering roller shades at exterior windows.

5.0 ROOM REQUIREMENTS

2.2 Front Desk

Space Characteristics

Function/adjacencies:

Adjacent to duty office, lobby, and public restrooms. Existing room to remain. New finishes and FF&E.
Room Data Sheet applies to Room Number(s): 102

Special Dimensions:

Ideal Plan Dimensions: 13'-0" W x 9'-3" D (116 sq ft min)
Minimum Ceiling Height: 9'-0" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Open Reception Desk Area/Access not required

Number of Occupants: 2

FF&E Information for Coordination:
FF&E and AV Equipment will be funded separately as a bid option to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design Workship (CDW). Space will accommodate, at a minimum, the following:

FF&E: Provide (2) task chairs. Provide waste bin.

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
C103010	Casework	-	-	Provide custom enclosed reception desk.
C301003	Gypsum Wallboard Finishes	-	-	High-performance painted GWB.
C302001	Tile Floor Finishes	-	12" x 24" Tile	Provide color body porcelain floor tile with rectified edges. Provide epoxy grout joints 1/8" or less.
C302007.A	Wall Base Finishes	-	4" Cove	Provide color body porcelain tile coved base to match floor tile.
C303001	Acoustical Ceiling Tiles and Panels	-	24" X 24" Tile	Provide acoustical ceiling tiles.
C303005	Suspension Systems	-	15mm "T" Grid	Provide 15mm factory finished metal "T" grid for 24" X 24" ACT.
D30	HVAC	-	-	Provide heating, ventilation, exhaust, and air conditioning, including all required control systems and devices, for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. The design drawings must conform to UFC 3-520-01.

D502002	Lighting Equipment	-	-	Provide LED lighting fixtures and automatic control. Emergency lighting fixtures via battery pack or central lighting inverter. Lighting solution and fixture aesthetics in this space must be coordinated with the Government. The design drawings must conform to UFC 3-530-01.
D503001.A	Work Area Outlet - Unclassified	3	-	Provide two (2) Category 6A Cabling Drops to Outlet (Includes conduit, box, cabling, jacks, etc.)

5.0 ROOM REQUIREMENTS

2.3 Lounge

Space Characteristics

Function/adjacencies:

Lounges are multi-use spaces. Areas will be provided for group lounge seating, singles lounge seating, video gaming, a large tabletop game (pool, ping pong, etc.), and a multi-use space for training activity overflow from the training room.
Room Data Sheet applies to Room Number(s): 319, 320, 364, 365

Special Dimensions:

Ideal Plan Dimensions: 24'-6" W x 20'-0" D (490 sq ft min)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: 25

FF&E Information for Coordination:

FF&E and AV Equipment will be funded separately as a bid option to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design Workship (CDW). Space will accommodate, at a minimum, the following:

FF&E: Provide sofas, loveseats, loung chairs, occasional tables, large tabletop game table, nesting tables, and nesting chairs. Provide microwave oven.

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
B202001	Windows	1	5'-4"W x 6' H	Provide window.
B203001	Solid Doors	2	3' W x 7' H	Exterior hollow metal door and frame.
C102007.I	Interior Door Hardware	2	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C103008.A	Counters	-	144" W	Provide 10mm thick solid acrylic countertop with full height solid acrylic backsplash and side splashes where counter abuts walls or adjacent cabinetry.
C103009.B	Cabinets	-	144" W	Provide plastic laminate over MDF cabinets. Base units with doors shall have adjustable shelving within. Provide wall mounted upper cabinets with adjustable shelving.
C301002	Plaster Wall Finishes	-	-	Repair and smooth existing plaster. High performance paint.
C301003	Gypsum Wallboard Finishes	-	-	High-performance painted GWB.
C302004	Resilient Floor Finishes	-	Plank Tile	Provide water-resistant luxury vinyl tile. Length to be at least 3 times the width.
C303003	Plaster Ceiling Finishes	-	-	Repair and smooth existing plaster ceilings. High performance paint.
D201006	Drinking Fountains and Coolers	1	-	Provide bi-level electric water cooler with bottle filler.

D30	HVAC	-	-	Provide heating, ventilation, exhaust, and air conditioning, including all required control systems and devices, for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. The design drawings must conform to UFC 3-520-01.
D502002	Lighting Equipment	-	-	Provide LED lighting fixtures and automatic control. Emergency lighting fixtures via battery pack or central lighting inverter. Lighting solution and fixture aesthetics in this space must be coordinated with the Government. The design drawings must conform to UFC 3-530-01.
D503001.A	Work Area Outlet - Unclassified	6	-	Provide two (2) Category 6A Cabling Drops to Outlet (Includes conduit, box, cabling, jacks, etc.)
D503001.G	Work Area Outlet - Wireless	4	-	Provide two (2) Category 6A Cabling Drops to or above Ceiling Outlet (Includes conduit, box, cabling, jacks, etc.)
E102009	Audiovisual Equipment	2	As Required	Provide a local CATV or IPTV connection.
E102009.A	Audiovisual Equipment	2	As Required	Provide signal wall plate for local computer and a local CATV or IPTV connection. Audio Playback . Collaboration capabilities.
E201002.A	Window Treatments	-	-	Provide double roller shade with both light filtering and black out applications.

5.0 ROOM REQUIREMENTS

2.4 Men's Restroom

Space Characteristics

Function/adjacencies:

Existing room to remain. New finishes and FF&E.
Room Data Sheet applies to Room Number(s): 105

Special Dimensions:

Ideal Plan Dimensions: 10'-9" W x 9'-4" D (80 sq ft min)
Minimum Ceiling Height: 9'-0" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Privacy Lockset with Occupancy Indicator

Number of Occupants: n/a

FF&E Information for Coordination:
FF&E and AV Equipment will be funded separately as a bid option to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design Workship (CDW). Space will accommodate, at a minimum, the following:

FF&E: Provide waste bin.

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
C102001.A	Standard Interior Doors	1	3' W x 7' H	Provide a solid core wood door.
C102007.E	Interior Door Hardware	-	-	Provide privacy lockset with occupancy indicator.
C103001	Compartments, Cubicles & Toilet Partitions	-	-	Provide 1" HDPE partitions.
C103002.B	Toilet and Bath Accessories	1	-	Provide stainless steel towel dispenser, soap dispenser, sanitary napkin bin, dual toilet paper dispenser, ABA grab bars, wall mounted mirror above sink, and a double coat hook.
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301004	Tile and Terrazzo Wall Finishes	-	-	Provide floor to ceiling, color body tiled wall with rectified edges. Provide epoxy grout joints 1/8" or less. Provide metal transition and corner strips.
C302001	Tile Floor Finishes	-	12" x 24" Tile	Provide color body porcelain floor tile with rectified edges. Provide epoxy grout joints 1/8” or less.
C303002	Gypsum Wallboard Ceiling Finishes	-	-	Provide moisture resistant gypsum board ceiling.
D201001.A	Water Closets	1	-	Provide floor mounted, back outlet ABA water closet with electronic flush valve. White color and include elongated bowl, closed seat, and lid.
D201002	Urinals	1	-	Provide ABA urinal.

D201003	Lavatories	1	-	Provide wall mounted ABA lavatory with washerless automatic control faucet.
D202001	Pipes and Fittings	-	-	Install new hot and cold piping and fittings to serve new fixtures.
D202004	Insulation & Identification	-	-	Install new supply piping insulation and identification tags where required.
D203001	Waste Pipe & Fittings	-	-	Install new waste piping to serve new fixtures.
D203002	Vent Pipe and Fittings	-	-	Install new vent piping to serve new fixtures.
D203003	Floor Drains	1	-	Provide floor drain.
D30	HVAC	-	-	Provide heating, ventilation, exhaust, and air conditioning, including all required control systems and devices, for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. The design drawings must conform to UFC 3-520-01.
D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures and automatic control, and emergency lighting. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.

5.0 ROOM REQUIREMENTS

2.5 Women's Restroom

Space Characteristics

Function/adjacencies:

Existing room to remain. New finishes and FF&E.
Room Data Sheet applies to Room Number(s): 107

Special Dimensions:

Ideal Plan Dimensions: 10'-9" W x 6'-7" D (60 sq ft min)
Minimum Ceiling Height: 9'-0" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Privacy Lockset with Occupancy Indicator

Number of Occupants: n/a

FF&E Information for Coordination:

FF&E and AV Equipment will be funded separately as a bid option to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design Workship (CDW). Space will accommodate, at a minimum, the following:

FF&E: Provide waste bin.

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
C102001.A	Standard Interior Doors	1	3' W x 7' H	Provide a solid core wood door.
C102007.E	Interior Door Hardware	-	-	Provide privacy lockset with occupancy indicator.
C103002.B	Toilet and Bath Accessories	1	-	Provide stainless steel towel dispenser, soap dispenser, sanitary napkin bin, dual toilet paper dispenser, ABA grab bars, wall mounted mirror above sink, and a double coat hook.
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301004	Tile and Terrazzo Wall Finishes	-	-	Provide floor to ceiling, color body tiled wall with rectified edges. Provide epoxy grout joints 1/8" or less. Provide metal transition and corner strips.
C302001	Tile Floor Finishes	-	12" x 24" Tile	Provide color body porcelain floor tile with rectified edges. Provide epoxy grout joints 1/8” or less.
C303002	Gypsum Wallboard Ceiling Finishes	-	-	Provide moisture resistant gypsum board ceiling.
D201001.A	Water Closets	1	-	Provide floor mounted, back outlet ABA water closet with electronic flush valve. White color and include elongated bowl, closed seat, and lid.
D201003	Lavatories	1	-	Provide wall mounted ABA lavatory with washerless automatic control faucet.
D202001	Pipes and Fittings	-	-	Install new hot and cold piping and fittings to serve new fixtures.

D202004	Insulation & Identification	-	-	Install new supply piping insulation and identification tags where required.
D203001	Waste Pipe & Fittings	-	-	Install new waste piping to serve new fixtures.
D203002	Vent Pipe and Fittings	-	-	Install new vent piping to serve new fixtures.
D203003	Floor Drains	1	-	Provide floor drain.
D30	HVAC	-	-	Provide heating, ventilation, exhaust, and air conditioning, including all required control systems and devices, for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. The design drawings must conform to UFC 3-520-01.
D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures and automatic control, and emergency lighting. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.

5.0 ROOM REQUIREMENTS

2.6 Vending

Space Characteristics

Function/adjacencies:

Locate vending areas on the ground floor with access from the parking areas. Existing room to remain. New finishes and Room Data Sheet applies to Room Number(s): 110

Special Dimensions:

Ideal Plan Dimensions: 10'-0" W x 10'-0" D (100 sq ft min)
Minimum Ceiling Height: 9'-0" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants:

FF&E Information for Coordination:
FF&E and AV Equipment will be funded separately as a bid option to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design Workship (CDW). Space will accommodate, at a minimum, the following:

FF&E: Provide waste receptacle and recycling container.

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
B203002.B	Glazed Doors	1	3'Wx7'H	Exterior hollow metal door and frame with 1/2 door wire glazing
B203008.E	Exterior Door Hardware	-	-	Provide entry lockset with access control and integration to Security Office for allow entry.
B203090	Other Exterior Specialty Doors	1	3' W x 7' H	Provide a hollow metal door with vision panel.
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301002	Plaster Wall Finishes	-	-	Repair and smooth existing plaster. High performance paint.
C302004	Resilient Floor Finishes	-	Plank Tile	Provide water-resistant luxury vinyl tile. Length to be at least 3 times the width.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C303003	Plaster Ceiling Finishes	-	-	Repair and smooth existing plaster ceilings. High performance paint.
D30	HVAC	-	-	Provide heating, ventilation, exhaust, and air conditioning, including all required control systems and devices, for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. The design drawings must conform to UFC 3-520-01.

D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures and automatic control, and emergency lighting. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.
E101003	Vending Equipment	4	-	Provide floor space and circulation for three soft drink machines and one snack vending machine.

5.0 ROOM REQUIREMENTS

2.7 Laundry

Space Characteristics

Function/adjacencies:

Existing room to remain. New finishes and FF&E.
Room Data Sheet applies to Room Number(s): 113, 184, 205, 278, 305, 378

Special Dimensions:

Ideal Plan Dimensions: 10'-0" W x 18'-4" D (184 sq ft min)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: n/a

FF&E Information for Coordination:

FF&E and AV Equipment will be funded separately as a bid option to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design Workship (CDW). Space will accommodate, at a minimum, the following:

FF&E: For each room provide (2) front loading washers (stacked). Provide (2) top loading washers. Provide (6) front loading electric dryers (stacked). Provide (1) front loading electric dryer.

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
B203002.B	Glazed Doors	1	3'Wx7'H	Exterior hollow metal door and frame with 1/2 door wire glazing
B203008.E	Exterior Door Hardware	-	-	Provide entry lockset with access control and integration to Security Office for allow entry.
B203090	Other Exterior Specialty Doors	1	3' W x 7' H	Provide a hollow metal door with vision panel.
C103002.F	Toilet and Bath Accessories	1	-	Provide stainless steel paper towel dispenser and soap dispenser.
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C103008.A	Counters	-	144" W	Provide 10mm thick solid acrylic countertop with full height solid acrylic backsplash and side splashes where counter abuts walls or adjacent cabinetry.
C103009.A	Cabinets	-	144" W	Provide plastic laminate over MDF cabinets. Base units with doors shall have adjustable shelving within.
C103010.A	Casework	-	192" W	Provide wall mounted hanging rods over casework with 4 linear feet for full height hanging.
C301002	Plaster Wall Finishes	-	-	Repair and smooth existing plaster. High performance paint.
C301002.A	Plaster Wall Finishes	-	-	Repair and smooth existing plaster. Epoxy paint.
C302001	Tile Floor Finishes	-	12" x 24" Tile	Provide color body porcelain floor tile with rectified edges. Provide epoxy grout joints 1/8” or less.

C302007.A	Wall Base Finishes	-	4" Cove	Provide color body porcelain tile coved base to match floor tile.
C303003	Plaster Ceiling Finishes	-	-	Repair and smooth existing plaster ceilings. High performance paint.
D201004.A	Sinks	1	-	Provide an under counter mounted kitchen sink with faucet.
D202001	Pipes and Fittings	-	-	Install new hot and cold piping and fittings to serve new fixtures.
D202004	Insulation & Identification	-	-	Install new supply piping insulation and identification tags where required.
D202005.A	Specialties	-	-	Provide washing machine connector box. Provide separate washing machine drain system with lint interceptor.
D203001	Waste Pipe & Fittings	-	-	Install new waste piping to serve new fixtures.
D203002	Vent Pipe and Fittings	-	-	Install new vent piping to serve new fixtures.
D203003	Floor Drains	1	-	Provide floor drain.
D209003	Interceptors	-	-	Provide lint interceptor for washing machine drainage system.
D30	HVAC	-	-	Provide heating, ventilation, dryer exhaust and makeup air, and air conditioning for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. The design drawings must conform to UFC 3-520-01.
D501090	Other Service and Distribution	-	As Required	Provide dedicated circuitry for washers and dryers. Equipment in this area must be suitable for application. The design drawings must conform to UFC 3-520-01.
D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures and automatic control, and emergency lighting. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.
D503001.G	Work Area Outlet - Wireless	1	-	Provide two (2) Category 6A Cabling Drops to or above Ceiling Outlet (Includes conduit, box, cabling, jacks, etc.)

5.0 ROOM REQUIREMENTS

3.1 Storage

Space Characteristics

Function/adjacencies:
Flexible storage space.
Room Data Sheet applies to Room Number(s): 104, 202, 203, 219A, 266A, 279, 280, 302, 303, 379, 380

Special Dimensions:

Ideal Plan Dimensions: 10'-0" W x 10'-0" D (100 sq ft), varies per plan based on available space
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: n/a

FF&E Information for Coordination:
FF&E and AV Equipment will be funded separately as a bid option to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design Workship (CDW). Space will accommodate, at a minimum, the following:
FF&E: Provide three high metal shelving where space permits.

Other/Special Requirements:
None

Uniformat Section	Description	Qty	Size	Specific Requirements
B203001	Solid Doors	1	3' W x 7' H	Exterior hollow metal door and frame.
B203008.E	Exterior Door Hardware	1	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301002	Plaster Wall Finishes	-	-	Repair and smooth existing plaster. High performance paint.
C301003	Gypsum Wallboard Finishes	-	-	High-performance painted GWB.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C302010	Hardeners and Sealers	-	-	Provide sealed concrete.
C303003	Plaster Ceiling Finishes	-	-	Repair and smooth existing plaster ceilings. High performance paint.
D30	HVAC	-	-	Provide heating, ventilation, exhaust, and air conditioning, including all required control systems and devices, for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. The design drawings must conform to UFC 3-520-01.

D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures and automatic control, and emergency lighting. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.

5.0 ROOM REQUIREMENTS

3.2 General Maintenance

Space Characteristics

Function/adjacencies:

Locate on main entry level to house general maintenance supplies.
Room Data Sheet applies to Room Number(s): 186

Special Dimensions:

Ideal Plan Dimensions: 10'-0" W x 18'-6" D (186 sq ft min)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: n/a

FF&E Information for Coordination:
FF&E and AV Equipment will be funded separately as a bid option to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design Workship (CDW). Space will accommodate, at a minimum, the following:

FF&E: Provide three high metal shelving where space permits.

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
B203001	Solid Doors	1	3' W x 7' H	Exterior hollow metal door and frame.
B203008.E	Exterior Door Hardware	1	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301002	Plaster Wall Finishes	-	-	Repair and smooth existing plaster. High performance paint.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C302010	Hardeners and Sealers	-	-	Provide sealed concrete.
C303003	Plaster Ceiling Finishes	-	-	Repair and smooth existing plaster ceilings. High performance paint.
D30	HVAC	-	-	Provide heating, ventilation, exhaust, and air conditioning, including all required control systems and devices, for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. The design drawings must conform to UFC 3-520-01.

D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures and automatic control, and emergency lighting. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.
D503001.F	Work Area Outlet - Unclassified	1	-	Provide one (1) Category 6A Cabling Drops for Wall Mount Telephone (Includes conduit, box, cabling, jacks, etc.)
[redacted]				

5.0 ROOM REQUIREMENTS

3.3 Janitorial

Space Characteristics

Function/adjacencies:

Janitorial includes vacuum cleaner storage, floor polisher storage, and janitor's sink and faucet, as well as storage for maintenance supplies. Existing room to remain. New finishes.
Room Data Sheet applies to Room Number(s): 106

Special Dimensions:

Ideal Plan Dimensions: 5'-5" W x 6'-4" D (33 sq ft min)
Minimum Ceiling Height: 9'-0" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: n/a

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
B203001	Solid Doors	1	3' W x 7' H	Exterior hollow metal door and frame.
B203008.E	Exterior Door Hardware	1	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103002.E	Toilet and Bath Accessories	1	-	Provide stainless steel utility hooks and shelf.
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301002.A	Plaster Wall Finishes	-	-	Repair and smooth existing plaster. Epoxy paint.
C301003.A	Gypsum Wallboard Finishes	-	-	Epoxy painted GWB.
C301090.A	Other Wall Finishes	-	-	Provide full height Fiber Reinforced Panels (FRP) on walls behind mop sink.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C302010	Hardeners and Sealers	-	-	Provide sealed concrete.
C3040	Interior Coatings and Special Finishes	-	-	Paint exposed ceiling structure.
D201004.B	Sinks	1	-	Provide a mop sink.
D202001	Pipes and Fittings	-	-	Install new hot and cold piping and fittings to serve new fixtures.
D202004	Insulation & Identification	-	-	Install new supply piping insulation and identification tags where required.
D203001	Waste Pipe & Fittings	-	-	Install new waste piping to serve new fixtures.
D203002	Vent Pipe and Fittings	-	-	Install new vent piping to serve new fixtures.
D30	HVAC	-	-	Provide exhaust.

D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. The design drawings must conform to UFC 3-520-01.
D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures and automatic control, and emergency lighting. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.
[redacted]				

5.0 ROOM REQUIREMENTS

3.4 Housekeeping

Space Characteristics

Function/adjacencies:
Janitorial includes vacuum cleaner storage, janitor's sink, and faucet per floor.
Room Data Sheet applies to Room Number(s): 112A, 204A, 304A

Special Dimensions:

Ideal Plan Dimensions: 5'-0" W x 5'-0" D (25 sq ft min)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: n/a

Other/Special Requirements:
None

Uniformat Section	Description	Qty	Size	Specific Requirements
B203001	Solid Doors	1	3' W x 7' H	Exterior hollow metal door and frame.
B203008.E	Exterior Door Hardware	1	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103002.E	Toilet and Bath Accessories	1	-	Provide stainless steel utility hooks and shelf.
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301002.A	Plaster Wall Finishes	-	-	Repair and smooth existing plaster. Epoxy paint.
C301003.A	Gypsum Wallboard Finishes	-	-	Epoxy painted GWB.
C301090.A	Other Wall Finishes	-	-	Provide full height Fiber Reinforced Panels (FRP) on walls behind mop sink.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C302010	Hardeners and Sealers	-	-	Provide sealed concrete.
C3040	Interior Coatings and Special Finishes	-	-	Paint exposed ceiling structure.
D201004.B	Sinks	1	-	Provide a mop sink.
D202001	Pipes and Fittings	-	-	Install new hot and cold piping and fittings to serve new fixtures.
D202004	Insulation & Identification	-	-	Install new supply piping insulation and identification tags where required.
D203001	Waste Pipe & Fittings	-	-	Install new waste piping to serve new fixtures.
D203002	Vent Pipe and Fittings	-	-	Install new vent piping to serve new fixtures.
D203003	Floor Drains	1	-	Provide floor drain.
D30	HVAC	-	-	Provide heating and exhaust.

D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. The design drawings must conform to UFC 3-520-01.
D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures and automatic control, and emergency lighting. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.
D503001.F	Work Area Outlet - Unclassified	1	-	Provide one (1) Category 6A Cabling Drops for Wall Mount Telephone (Includes conduit, box, cabling, jacks, etc.)

5.0 ROOM REQUIREMENTS

3.5 Maintenance Storage

Space Characteristics

Function/adjacencies:

Room for housekeeping equipment and supplies.
Room Data Sheet applies to Room Number(s): 219B

Special Dimensions:

Ideal Plan Dimensions: 20'-0" W x 15'-9" D (315 sqft, 250 sq ft min)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: n/a

FF&E Information for Coordination:

FF&E and AV Equipment will be funded separately as a bid option to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design Workship (CDW). Space will accommodate, at a minimum, the following:

FF&E: Provide three high metal shelving where space permits. Provide (1) lockable storage cabinet with doors. Provide 30" x 72" standing height workbench.

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
B203001	Solid Doors	1	3' W x 7' H	Exterior hollow metal door and frame.
B203008.E	Exterior Door Hardware	1	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301002	Plaster Wall Finishes	-	-	Repair and smooth existing plaster. High performance paint.
C301003	Gypsum Wallboard Finishes	-	-	High-performance painted GWB.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C302010	Hardeners and Sealers	-	-	Provide sealed concrete.
C3040	Interior Coatings and Special Finishes	-	-	Paint exposed ceiling structure.
D30	HVAC	-	-	Provide heating, ventilation, exhaust, and air conditioning, including all required control systems and devices, for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles. The design drawings must conform to UFC 3-520-01.

D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures and automatic control, and emergency lighting. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.

5.0 ROOM REQUIREMENTS

4.1 Barracks

Space Characteristics

Function/adjacencies:

Existing double occupancy rooms with a built in closet per occupant. Minimum Net Square Footage for the Living/Sleeping Area and Service Area is 180 ft2. New finishes and FF&E.

Room Data Sheet applies to Room Number(s): 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 129, 130, 131, 132, 133, 135, 136, 137, 138, 139, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 154, 155, 156, 159, 160, 161, 162, 163, 165, 166, 167, 168, 169, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 220, 221, 222, 223, 224, 225, 227, 228, 229, 230, 231, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 246, 247, 248, 253, 254, 255, 256, 257, 259, 260, 261, 262, 263, 264, 265, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 321, 322, 323, 324, 325, 327, 328, 329, 330, 331, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 346, 347, 348, 353, 354, 355, 356, 357, 359, 360, 361, 362, 363, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377

Special Dimensions:

Ideal Plan Dimensions: 14'-0" W x 21'-10" D (305 sq ft min)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: 2

FF&E Information for Coordination:

FF&E and AV Equipment will be funded separately as a bid option to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design Workship (CDW). Space will accommodate, at a minimum, the following:

FF&E: Provide (2) twin extra-long beds, (2) desk units, (2) desk chairs, (2) night stands, (2) stacked set of drawers, refrigerator, and microwave. Provide wall mounted ironing board and mount with storage shelf for iron. Provide window treatments.

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
B202001.B	Windows	1	1'-4"W x 6' H	Provide window.
B202090	Other Exterior Windows	1	1'W x 4' H	Exterior hollow metal window and frame.
B203001	Solid Doors	1	3' W x 7' H	Exterior hollow metal door and frame.
B203008.E	Exterior Door Hardware	-	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103002.A	Toilet and Bath Accessories	2	27" H x 17" W	Provide wall mounted medicine cabinet at sink.
C103002.F	Toilet and Bath Accessories	1	-	Provide stainless steel paper towel dispenser and soap dispenser.
C103002.G	Toilet and Bath Accessories	1	-	Provide full size mirror mounted on service side of restroom door.
C103003.A	Marker Boards and Tack Boards	One per occupant	36" W x 48" D	Provide tackboard(s).
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.

C103008	Counters	2	36" W	Provide 10mm thick solid acrylic countertop with full height solid acrylic backsplash and side splashes where counter abuts walls or adjacent cabinetry. One with vanity sink and one for microwave.
C103009	Cabinets	2	36" W	Provide plastic laminate over MDF sink cabinet with two doors. One with vanity sink and one for microwave.
C301002	Plaster Wall Finishes	-	-	Repair and smooth existing plaster. High performance paint.
C301003	Gypsum Wallboard Finishes	-	-	High-performance painted GWB.
C301005	Wall Coverings	-	-	Provide corner guards.
C302004	Resilient Floor Finishes	-	Plank Tile	Provide water-resistant luxury vinyl tile. Length to be at least 3 times the width.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C303003	Plaster Ceiling Finishes	-	-	Repair and smooth existing plaster ceilings. High performance paint.
D201003.A	Lavatories	1	-	Provide an under-mount lavatory with single lever manual washerless faucet.
D202001	Pipes and Fittings	-	-	Install new hot and cold piping and fittings to serve new fixtures.
D202004	Insulation & Identification	-	-	Install new supply piping insulation and identification tags where required.
D203001	Waste Pipe & Fittings	-	-	Install new waste piping to serve new fixtures.
D203002	Vent Pipe and Fittings	-	-	Install new vent piping to serve new fixtures.
D30	HVAC	-	-	Provide heating, ventilation, exhaust, and air conditioning, including all required control systems and devices, for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. Provide a recessed panelboard or load center in each bedroom unit. The design drawings must conform to UFC 3-520-01 and FC 4-721-10N.
D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures, switches and automatic control. The design drawings must conform to UFC 3-530-01 and FC 4-721-10N Section 3-14.3.
D503001.A	Work Area Outlet - Unclassified	2	-	Provide two (2) Category 6A Cabling Drops to Outlet (Includes conduit, box, cabling, jacks, etc.)
D503001.G	Work Area Outlet - Wireless	1	-	Provide two (2) Category 6A Cabling Drops to or above Ceiling Outlet (Includes conduit, box, cabling, jacks, etc.)
E201002.A	Window Treatments	-	-	Provide double roller shade with both light filtering and black out applications.

5.0 ROOM REQUIREMENTS

4.2 Restroom

Space Characteristics

Function/adjacencies:

Restrooms for double barrack units with new fixtures and finishes.

Room Data Sheet applies to Room Number(s): 115A, 116A, 117A, 118A, 119A, 120A, 121A, 122A, 123A, 124A, 125A, 129A, 130A, 131A, 132A, 133A, 135A, 136A, 137A, 138A, 139A, 143A, 144A, 145A, 146A, 147A, 148A, 149A, 150A, 151A, 152A, 154A, 155A, 156A, 159A, 160A, 161A, 162A, 163A, 165A, 166A, 167A, 168A, 169A, 173A, 174A, 175A, 176A, 177A, 178A, 179A, 180A, 181A, 182A, 183A, 207A, 208A, 209A, 210A, 211A, 212A, 213A, 214A, 215A, 216A, 217A, 220A, 221A, 222A, 223A, 224A, 225A, 227A, 228A, 229A, 230A, 231A, 233A, 234A, 235A, 236A, 237A, 238A, 239A, 240A, 241A, 242A, 243A, 244A, 246A, 247A, 248A, 253A, 254A, 255A, 256A, 257A, 259A, 260A, 261A, 262A, 263A, 264A, 265A, 267A, 268A, 269A, 270A, 271A, 272A, 273A, 274A, 275A, 276A, 277A, 307A, 308A, 309A, 310A, 311A, 312A, 313A, 314A, 315A, 316A, 317A, 321A, 322A, 323A, 324A, 325A, 327A, 328A, 329A, 330A, 331A, 333A, 334A, 335A, 336A, 337A, 338A, 339A, 340A, 341A, 342A, 343A, 344A, 346A, 347A, 348A, 353A, 354A, 355A, 356A, 357A, 359A, 360A, 361A, 362A, 363A, 367A, 368A, 369A, 370A, 371A, 372A, 373A, 374A, 375A, 376A, 377A

Special Dimensions:

Ideal Plan Dimensions: 6'-0" W x 5'-6" D (33 sq ft min)
Minimum Ceiling Height: 7'-0" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Privacy Lockset with Occupancy Indicator

Number of Occupants: n/a

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
C102001.F	Standard Interior Doors	1	2'Wx'7' H	Provide solid core wood 2' door.
C102007.E	Interior Door Hardware	-	-	Provide privacy lockset with occupancy indicator.
C103002.D	Toilet and Bath Accessories	2	-	Provide shower with recessed soap dish, towel rods, and double coat hooks.
C301002.A	Plaster Wall Finishes	-	-	Repair and smooth existing plaster. Epoxy paint.
C301004	Tile and Terrazzo Wall Finishes	-	-	Provide floor to ceiling, color body tiled wall with rectified edges. Provide epoxy grout joints 1/8" or less. Provide metal transition and corner strips.
C301090 / D201005	Showers	1	36"W x 36"D	Provide showers with seamless (except at corners) floor to ceiling solid surface surround and floor drain.
C302001	Tile Floor Finishes	-	12" x 24" Tile	Provide color body porcelain floor tile with rectified edges. Provide epoxy grout joints 1/8" or less.
C303002	Gypsum Wallboard Ceiling Finishes	-	-	Provide moisture resistant gypsum board ceiling.
D201001	Water Closets	1	-	Provide low-consumption, floor mounted, back outlet water closet with tank and manual flush controls. White color and Include elongated bowl, closed seat, and lid.
D202001	Pipes and Fittings	-	-	Install new hot and cold piping and fittings to serve new fixtures.

D202004	Insulation & Identification	-	-	Install new supply piping insulation and identification tags where required.
D203001	Waste Pipe & Fittings	-	-	Install new waste piping to serve new fixtures.
D203002	Vent Pipe and Fittings	-	-	Install new vent piping to serve new fixtures.
D30	HVAC	-	-	Provide heating, ventilation, exhaust, and air conditioning, including all required control systems and devices, for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. The design drawings must conform to UFC 3-520-01.
D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures, switches and automatic control. The design drawings must conform to UFC 3-530-01 and FC 4-721-10N Section 3-14.3.
[redacted]				

5.0 ROOM REQUIREMENTS

4.3 Closet

Space Characteristics

Function/adjacencies:

Personal closet for double barrack units. One closet per occupant.

Room Data Sheet applies to Room Number(s): 115B, 115C, 116B, 116C, 117B, 117C, 118B, 118C, 119B, 119C, 120B, 120C, 121B, 121C, 122B, 122C, 123B, 123C, 124B, 124C, 125B, 125C, 129B, 129C, 130B, 130C, 131B, 131C, 132B, 132C, 133B, 133C, 135B, 135C, 136B, 136C, 137B, 137C, 138B, 138C, 139B, 139C, 143B, 143C, 144B, 144C, 145B, 145C, 146B, 146C, 147B, 147C, 148B, 148C, 149B, 149C, 150B, 150C, 151B, 151C, 152B, 152C, 154B, 154C, 155C, 156B, 156C, 159B, 159C, 160B, 160C, 161B, 161C, 162B, 162C, 163B, 163C, 165B, 165C, 166B, 166C, 167B, 167C, 168B, 168C, 169B, 169C, 173B, 173C, 174B, 174C, 175B, 175C, 176B, 176C, 177B, 177C, 178B, 178C, 179B, 179C, 180B, 180C, 181B, 181C, 182B, 182C, 183B, 183C, 207B, 207C, 208B, 208C, 209B, 209C, 210B, 210C, 211B, 211C, 212B, 212C, 213B, 213C, 214B, 214C, 215B, 215C, 216B, 216C, 217B, 217C, 220B, 220C, 221B, 221C, 222B, 222C, 223B, 223C, 224B, 224C, 225B, 225C, 227B, 227C, 228B, 228C, 229B, 229C, 230B, 230C, 231B, 231C, 233B, 233C, 234B, 234C, 235B, 235C, 236B, 236C, 237B, 237C, 238B, 238C, 239B, 239C, 240B, 240C, 241B, 241C, 242B, 242C, 243B, 243C, 244B, 244C, 246B, 246C, 247B, 247C, 248B, 248C, 253B, 253C, 254B, 254C, 255B, 255C, 256B, 256C, 257B, 257C, 259B, 259C, 260B, 260C, 261B, 261C, 262B, 262C, 262C, 263B, 264B, 264C, 265B, 265C, 267B, 267C, 268B, 268C, 269B, 269C, 270B, 270C, 271B, 271C, 272B, 272C, 273B, 273C, 274B, 274C, 275B, 275C, 276B, 276C, 277B, 277C, 307B, 307C, 308B, 308C, 309B, 309C, 310B, 310C, 311B, 311C, 312B, 312C, 313B, 313C, 314B, 314C, 315B, 315C, 316B, 316C, 317B, 317C, 321B, 321C, 322B, 322C, 323B, 323C, 324B, 324C, 325B, 325C, 327B, 327C, 328B, 328C, 329B, 329C, 330B, 330C, 331B, 331C, 333B, 333C, 334B, 334C, 335B, 335C, 336B, 336C, 337B, 337C, 338B, 338C, 339B, 339C, 340B, 340C, 341B, 341C, 342B, 342C, 343B, 343C, 344B, 344C, 346B, 346C, 347B, 347C, 348B, 348C, 353B, 353C, 354B, 354C, 355B, 355C, 356B, 356C, 357B, 357C, 359B, 359C, 360B, 360C, 361B, 361C, 362B, 362C, 363B, 363C, 367B, 367C, 368B, 368C, 369B, 369C, 370B, 370C, 371B, 371C, 372B, 372C, 373B, 373C, 374B, 374C, 375B, 375C, 376B, 376C, 377B, 377C

Special Dimensions:

Ideal Plan Dimensions: 3'-6" W x 2'-0" D (7 sq ft min)
Minimum Ceiling Height: 7'-0" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Roller Catch with door pulls/double doors

Number of Occupants: n/a

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
C102001.G	Standard Interior Doors	2	1-5"' W x 7' H	Provide pair of solid core wood 1'-5" door.
C102007.H	Interior Door Hardware	2	-	Provide roller catch and door pulls for pair of doors
C103011	Closets	-	-	Provide closet rods and organizers with storage capability extending to the ceiling.
C301002	Plaster Wall Finishes	-	-	Repair and smooth existing plaster. High performance paint.
C301003	Gypsum Wallboard Finishes	-	-	High-performance painted GWB.
C302004	Resilient Floor Finishes	-	Plank Tile	Provide water-resistant luxury vinyl tile. Length to be at least 3 times the width.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C303003	Plaster Ceiling Finishes	-	-	Repair and smooth existing plaster ceilings. High performance paint.

D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures, switches and automatic control. The design drawings must conform to UFC 3-530-01 and FC 4-721-10N Section 3-14.3.

5.0 ROOM REQUIREMENTS

4.4 ABA Barracks

Space Characteristics

Function/adjacencies:

Converting existing double occupancy rooms to a single occupant ABA room. Minimum Net Square Footage for the Living/Sleeping Area and Service Area is 180 ft2. New finishes and FF&E.
Room Data Sheet applies to Room Number(s): 141, 142

Special Dimensions:

Ideal Plan Dimensions: 10'-0" W x 10'-0" D (100 sq ft min)
Minimum Ceiling Height: 9'-0" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: 1

FF&E Information for Coordination:

FF&E and AV Equipment will be funded separately as a bid option to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design Workship (CDW). Space will accommodate, at a minimum, the following:

FF&E: Provide twin extra-long beds, desk unit, desk chair, night stand, stacked set of drawers, refrigerator, and microwave. Provide wall mounted ironing board and mount with storage shelf for iron. Provide window treatments.

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
B202001.B	Windows	1	1'-4"W x 6' H	Provide window.
B202090	Other Exterior Windows	1	1'W x 4' H	Exterior hollow metal window and frame.
B203001	Solid Doors	1	3' W x 7' H	Exterior hollow metal door and frame.
B203008.E	Exterior Door Hardware	-	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103002.A	Toilet and Bath Accessories	1	27" H x 17" W	Provide wall mounted medicine cabinet at sink.
C103002.G	Toilet and Bath Accessories	1	-	Provide full size mirror mounted on service side of restroom door.
C103003.A	Marker Boards and Tack Boards	One per occupant	36" W x 48" D	Provide tackboard(s).
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C103008	Counters	2	36" W	Provide 10mm thick solid acrylic countertop with full height solid acrylic backsplash and side splashes where counter abuts walls or adjacent cabinetry. One with vanity sink and one for microwave.
C103009	Cabinets	2	36" W	Provide plastic laminate over MDF sink cabinet with two doors. One with vanity sink and one for microwave.
C301002	Plaster Wall Finishes	-	-	Repair and smooth existing plaster. High performance paint.
C301003	Gypsum Wallboard Finishes	-	-	High-performance painted GWB.

C301005	Wall Coverings	-	-	Provide corner guards.
C302004	Resilient Floor Finishes	-	Plank Tile	Provide water-resistant luxury vinyl tile. Length to be at least 3 times the width.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C303003	Plaster Ceiling Finishes	-	-	Repair and smooth existing plaster ceilings. High performance paint.
D30	HVAC	-	-	Provide heating, ventilation, exhaust, and air conditioning, including all required control systems and devices, for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. Provide a recessed panelboard or load center in each bedroom unit. The design drawings must conform to UFC 3-520-01 and FC 4-721-10N.
D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures, switches and automatic control. The design drawings must conform to UFC 3-530-01 and FC 4-721-10N Section 3-14.3.
D503001.A	Work Area Outlet - Unclassified	2	-	Provide two (2) Category 6A Cabling Drops to Outlet (Includes conduit, box, cabling, jacks, etc.)
D503001.G	Work Area Outlet - Wireless	1	-	Provide two (2) Category 6A Cabling Drops to or above Ceiling Outlet (Includes conduit, box, cabling, jacks, etc.)
E201002.A	Window Treatments	-	-	Provide double roller shade with both light filtering and black out applications.
[redacted]				

5.0 ROOM REQUIREMENTS

4.5 ABA Restroom

Space Characteristics

Function/adjacencies:
Restrooms for single ABA barrack unit with new fixtures and finishes.
Room Data Sheet applies to Room Number(s): 141A, 142A

Special Dimensions:

Ideal Plan Dimensions: 14'-0" W x 6'-0" D (84 sq ft min)
Minimum Ceiling Height: 7'-0" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Privacy Lockset with Occupancy Indicator

Number of Occupants: n/a

Other/Special Requirements:
None

Uniformat Section	Description	Qty	Size	Specific Requirements
C102001.A	Standard Interior Doors	1	3' W x 7' H	Provide a solid core wood door.
C102007.E	Interior Door Hardware	-	-	Provide privacy lockset with occupancy indicator.
C103002.C	Toilet and Bath Accessories	1	-	Provide shower with recessed soap dish, ABA and NFPA grab bars, wall mounted shower seat, and double coat hook.
C301002	Plaster Wall Finishes	-	-	Repair and smooth existing plaster. High performance paint.
C301003.A	Gypsum Wallboard Finishes	-	-	Epoxy painted GWB.
C301004	Tile and Terrazzo Wall Finishes	-	-	Provide floor to ceiling, color body tiled wall with rectified edges. Provide epoxy grout joints 1/8" or less. Provide metal transition and corner strips.
C301090 / D201005	Showers	1	36"W x 36"D	Provide showers with seamless (except at corners) floor to ceiling solid surface surround and floor drain.
C302001	Tile Floor Finishes	-	12" x 24" Tile	Provide color body porcelain floor tile with rectified edges. Provide epoxy grout joints 1/8" or less.
C303002	Gypsum Wallboard Ceiling Finishes	-	-	Provide moisture resistant gypsum board ceiling.
D201001.B	Water Closets	1	-	Provide low-consumption, floor mounted, back outlet ABA water closet with tank and manual flush controls. White color and include elongated bowl, closed seat, and lid.
D201003.B	Lavatories	1	-	Provide an ABA under-mount lavatory with single lever manual washerless faucet.
D202001	Pipes and Fittings	-	-	Install new hot and cold piping and fittings to serve new fixtures.
D202004	Insulation & Identification	-	-	Install new supply piping insulation and identification tags where required.

D203001	Waste Pipe & Fittings	-	-	Install new waste piping to serve new fixtures.
D203002	Vent Pipe and Fittings	-	-	Install new vent piping to serve new fixtures.
D30	HVAC	-	-	Provide heating, ventilation, exhaust, and air conditioning, including all required control systems and devices, for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D5010	Electrical Service and Distribution	-	As Required	Provide general purpose receptacles and dedicated connections to utilization equipment. The design drawings must conform to UFC 3-520-01 and FC 4-721-10N.
D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures, switches and automatic control. The design drawings must conform to UFC 3-530-01 and FC 4-721-10N Section 3-14.3.

5.0 ROOM REQUIREMENTS

4.6 ABA Closet

Space Characteristics

Function/adjacencies:
Personal closet for single ABA barrack unit. One closet per occupant.
Room Data Sheet applies to Room Number(s): 141B, 142B

Special Dimensions:

Ideal Plan Dimensions: 3'-6" W x 2'-0" D (7 sq ft min)
Minimum Ceiling Height: 7'-0" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Roller Catch with door pulls/double doors

Number of Occupants: n/a

Other/Special Requirements:
None

Uniformat Section	Description	Qty	Size	Specific Requirements
C102001.G	Standard Interior Doors	2	1-5"' W x 7' H	Provide pair of solid core wood 1'-5" door.
C102007.H	Interior Door Hardware	2	-	Provide roller catch and door pulls for pair of doors
C103011	Closets	-	-	Provide closet rods and organizers with storage capability extending to the ceiling.
C301002	Plaster Wall Finishes	-	-	Repair and smooth existing plaster. High performance paint.
C301003	Gypsum Wallboard Finishes	-	-	High-performance painted GWB.
C302004	Resilient Floor Finishes	-	Plank Tile	Provide water-resistant luxury vinyl tile. Length to be at least 3 times the width.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C303003	Plaster Ceiling Finishes	-	-	Repair and smooth existing plaster ceilings. High performance paint.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures, switches and automatic control. The design drawings must conform to UFC 3-530-01 and FC 4-721-10N Section 3-14.3.
D503002.A	Telecommunications Cabinet	1	-	Provide one (1) 42U Floor Mount Cabinet (Qty as Required for Network types), approx. 24"x36"x84. Includes PDU, fan units, cable management panels, grounding, etc.

5.0 ROOM REQUIREMENTS

5.1 Communications

Space Characteristics

Function/adjacencies:

New communications room for new equipment. Provide vertical alignment with Comms room on other floors, Bldgs. 1 and 3. For the middle win, provide a cabinet (24" square x 84" high with casters for rolling, HCMs and a vertical PDU and ground bar in the closet on the first floor.of the ABA room).

Room Data Sheet applies to Room Number(s): 126C

Special Dimensions:

Ideal Plan Dimensions: 10'-0" W x 8'-0" D (80 sq ft min). No ceiling.
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: n/a

Other/Special Requirements:

Wall mount 3/4" x 4" x 8' fire retardant treated plywood vertically mounted on wall walls. SSB ground bar. Cable tray (12" w x 4" d) wire mesh above racks.

Uniformat Section	Description	Qty	Size	Specific Requirements
B203001	Solid Doors	1	3' W x 7' H	Exterior hollow metal door and frame.
B203008.E	Exterior Door Hardware	1	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301001.A	CMU Wall Finish	-	-	Epoxy painted CMU with a grout or resin finish for uniformly smooth surface.
C301003.A	Gypsum Wallboard Finishes	-	-	Epoxy painted GWB.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C302010	Hardeners and Sealers	-	-	Provide sealed concrete.
C3040	Interior Coatings and Special Finishes	-	-	Paint exposed ceiling structure.
D30	HVAC	-	-	Provide air conditioning and positive pressurization in accordance with UFC 3-580-01.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D50	Open racks w/ PDUs vertical mount. on floors 1-3 in Bldgs. 1 and 3..	2	24" w x 84" h w/6" VCMs	Bolted to floor. Provide HCMs and patch panels.for Bldgs. 1 and 3. For the middle wing, provide 1 cabinet on the first floor.

D501090	Other Service and Distribution	-	As Required	Provide dedicated circuitry for receptacles. Equipment in this area must be suitable for application. Provide dedicated panelboard in Communications room. The design drawings must conform to UFC 3-520-01 and UFC 3-580-01.
D502002.A	Lighting Equipment	-	-	Provide LED lighting fixtures, automatic control is prohibited. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.
D503001.D	Work Area Outlet (Media)	1	-	Provide one (1) Category 6A Cabling Drop, one (1) Coaxial Drop to Outlet (Includes conduit, box, cabling, jacks, etc.)
D503002.A	Telecommunications Cabinet	2	-	Provide one (1) 42U Floor Mount Cabinet (Qty as Required for Network types), approx. 24"x36"x84. Includes PDU, fan units, cable management panels, grounding, etc.
D503002.B	Ladder Tray	1	-	Provide ladder tray over Telecommunications Cabinets and for pathways entering the TR. Size based on estimated content and fill ratio.
D503002.C	Wall Board	3	-	Provide fire rated wall board per UFC.
D503002.E	Cable Tray	1	-	Provide cable tray with all support, transition, grounding and bonding per UFC. Size based on estimated content and fill ratio.

5.0 ROOM REQUIREMENTS

5.2 Comms/AV

Space Characteristics

Function/adjacencies:
New AV rooms for server equipment. Two rooms per level.
Room Data Sheet applies to Room Number(s): 108A, 126A, 171, 219C, 266B, 319A, 365A

Special Dimensions:

Ideal Plan Dimensions: 8'-0" W x 10'-0" D (80 sq ft min)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: n/a

Other/Special Requirements:
None

Uniformat Section	Description	Qty	Size	Specific Requirements
B203001.A	Solid Doors	1	6' W x 7' H	Exterior hollow metal double door and frame.
C102007.I	Interior Door Hardware	1	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301001.A	CMU Wall Finish	-	-	Epoxy painted CMU with a grout or resin finish for uniformly smooth surface.
C301003.A	Gypsum Wallboard Finishes	-	-	Epoxy painted GWB.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C302010	Hardeners and Sealers	-	-	Provide sealed concrete.
C3040	Interior Coatings and Special Finishes	-	-	Paint exposed ceiling structure.
D30	HVAC	-	-	Provide air conditioning and positive pressurization in accordance with UFC 3-580-01.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D501090	Other Service and Distribution	-	As Required	Provide dedicated circuitry for receptacles. Equipment in this area must be suitable for application. Provide dedicated panelboard in Communications room. The design drawings must conform to UFC 3-520-01 and UFC 3-580-01.

D502002.A	Lighting Equipment	-	-	Provide LED lighting fixtures, automatic control is prohibited. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.
D503002.A	Telecommunications Cabinet	1	-	Provide one (1) 42U Floor Mount Cabinet (Qty as Required for Network types), approx. 24"x36"x84. Includes PDU, fan units, cable management panels, grounding, etc.
D503002.B	Ladder Tray	1	-	Provide ladder tray over Telecommunications Cabinets and for pathways entering the TR. Size based on estimated content and fill ratio.
D503002.C	Wall Board	1	-	Provide fire rated wall board per UFC.
D503002.D	Grounding/Bonding	1	-	Provide grounding and bonding per UFC.
D503002.E	Cable Tray	1	-	Provide cable tray with all support, transition, grounding and bonding per UFC. Size based on estimated content and fill ratio.

5.0 ROOM REQUIREMENTS

5.3 Comms Closet

Space Characteristics

Function/adjacencies:
New AV rooms for server equipment. Two rooms per building on the first level.
Room Data Sheet applies to Room Number(s): 141C, 142C

Special Dimensions:

Ideal Plan Dimensions: 2'-0" W x 3'-6" D (7 sq ft min)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: n/a

Other/Special Requirements:
None

Uniformat Section	Description	Qty	Size	Specific Requirements
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C102001.A	Standard Interior Doors	1	3' W x 7' H	Provide a solid core wood door.
B203008.E	Exterior Door Hardware	-	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C301001.A	CMU Wall Finish	-	-	Epoxy painted CMU with a grout or resin finish for uniformly smooth surface.
C301003.A	Gypsum Wallboard Finishes	-	-	Epoxy painted GWB.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C302010	Hardeners and Sealers	-	-	Provide sealed concrete.
C3040	Interior Coatings and Special Finishes	-	-	Paint exposed ceiling structure.
D30	HVAC	-	-	Provide air conditioning and positive pressurization in accordance with UFC 3-580-01.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D501090	Other Service and Distribution	-	As Required	Provide dedicated circuitry for receptacles. Equipment in this area must be suitable for application. Provide dedicated panelboard in Communications room. The design drawings must conform to UFC 3-520-01 and UFC 3-580-01.

D502002.A	Lighting Equipment	-	-	Provide LED lighting fixtures, automatic control is prohibited. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.
D503002.A	Telecommunications Cabinet	1	-	Provide one (1) 42U Floor Mount Cabinet (Qty as Required for Network types), approx. 24"x36"x84. Includes PDU, fan units, cable management panels, grounding, etc.
D503002.B	Ladder Tray	1	-	Provide ladder tray over Telecommunications Cabinets and for pathways entering the TR. Size based on estimated content and fill ratio.
D503002.C	Wall Board	1	-	Provide fire rated wall board per UFC.
D503002.D	Grounding/Bonding	1	-	Provide grounding and bonding per UFC.
D503002.E	Cable Tray	1	-	Provide cable tray with all support, transition, grounding and bonding per UFC. Size based on estimated content and fill ratio.

5.0 ROOM REQUIREMENTS

6.1 Main Electrical

Space Characteristics

Function/adjacencies:
New main electrical room.
Room Data Sheet applies to Room Number(s): 126B

Special Dimensions:

Ideal Plan Dimensions: 8'-0" W x 10'-0" D (80 sq ft min)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: n/a

Other/Special Requirements:
None

Uniformat Section	Description	Qty	Size	Specific Requirements
B203001.A	Solid Doors	1	6' W x 7' H	Exterior hollow metal double door and frame.
B203008.E	Exterior Door Hardware	-	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301001.A	CMU Wall Finish	-	-	Epoxy painted CMU with a grout or resin finish for uniformly smooth surface.
C301003.A	Gypsum Wallboard Finishes	-	-	Epoxy painted GWB.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C302010	Hardeners and Sealers	-	-	Provide sealed concrete.
C3040	Interior Coatings and Special Finishes	-	-	Paint exposed ceiling structure.
D30	HVAC	-	-	Provide heating and air conditioning for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D501090	Other Service and Distribution	-	As Required	Provide dedicated circuitry for receptacles. Equipment in this area must be suitable for application. Provide switchboard and/or panelboards in Electrical Rooms as required. The design drawings must conform to UFC 3-520-01 and UFC 3-580-01.
D502002.A	Lighting Equipment	-	-	Provide LED lighting fixtures, automatic control is prohibited. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.

D503001.F	Work Area Outlet - Unclassified	1	-	Provide one (1) Category 6A Cabling Drops for Wall Mount Telephone (Includes conduit, box, cabling, jacks, etc.)
D503001.G	Work Area Outlet - Wireless	1	-	Provide two (2) Category 6A Cabling Drops to or above Ceiling Outlet (Includes conduit, box, cabling, jacks, etc.)
[redacted]				

5.0 ROOM REQUIREMENTS

6.2 Electrical

Space Characteristics

Function/adjacencies:
New secondary electrical rooms. Provide two per floor.
Room Data Sheet applies to Room Number(s): 112, 185, 204, 279A, 304, 379A

Special Dimensions:

Ideal Plan Dimensions: 6'-0" W x 6'-0" D (36 sq ft min)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: n/a

Other/Special Requirements:
None

Uniformat Section	Description	Qty	Size	Specific Requirements
B203001.A	Solid Doors	1	6' W x 7' H	Exterior hollow metal double door and frame.
B203008.E	Exterior Door Hardware	-	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301001.A	CMU Wall Finish	-	-	Epoxy painted CMU with a grout or resin finish for uniformly smooth surface.
C301003.A	Gypsum Wallboard Finishes	-	-	Epoxy painted GWB.
C301005	Wall Coverings	-	-	Provide corner guards.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C302010	Hardeners and Sealers	-	-	Provide sealed concrete.
C3040	Interior Coatings and Special Finishes	-	-	Paint exposed ceiling structure.
D30	HVAC	-	-	Provide heating and air conditioning for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D501090	Other Service and Distribution	-	As Required	Provide dedicated circuitry for receptacles. Equipment in this area must be suitable for application. Provide switchboard and/or panelboards in Electrical Rooms as required. The design drawings must conform to UFC 3-520-01 and UFC 3-580-01.

D502002.A	Lighting Equipment	-	-	Provide LED lighting fixtures, automatic control is prohibited. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.

5.0 ROOM REQUIREMENTS

7.1 Mechanical

Space Characteristics

Function/adjacencies:
Existing main mechanical room. New finishes.
Room Data Sheet applies to Room Number(s): 108

Special Dimensions:

Ideal Plan Dimensions: 47'-4" W x 16'-0" D (757 sq ft min)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: n/a

Other/Special Requirements:
None

Uniformat Section	Description	Qty	Size	Specific Requirements
B203001.A	Solid Doors	1	6' W x 7' H	Exterior hollow metal double door and frame.
B203008.E	Exterior Door Hardware	-	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301001.A	CMU Wall Finish	-	-	Epoxy painted CMU with a grout or resin finish for uniformly smooth surface.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C302010	Hardeners and Sealers	-	-	Provide sealed concrete.
C3040	Interior Coatings and Special Finishes	-	-	Paint exposed ceiling structure.
D202001	Pipes and Fittings	-	-	Install new hot and cold piping and fittings to serve new fixtures.
D202002	Valves & Hydrants	-	-	Provide isolation and shut-off valves, provide hose bibbs or wall hydrants where required.
D202003	Domestic Water Equipment	1	-	Provide water heating and distribution equipment and piping.
D202004	Insulation & Identification	-	-	Install new supply piping insulation and identification tags where required.
D202090	Other Domestic Water Supply	-	-	Provide pipe supports, inspections, disinfection, and testing.
D203001	Waste Pipe & Fittings	-	-	Install new waste piping to serve new fixtures.
D203002	Vent Pipe and Fittings	-	-	Install new vent piping to serve new fixtures.
D203003	Floor Drains	1	-	Provide floor drain.
D209001	Special Piping Systems	1	-	Provide natural gas connection.
D30	HVAC	-	-	Provide heating and air conditioning for temperature control.

D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D501090	Other Service and Distribution	-	As Required	Provide general purpose receptacles and mechanical equipment connections. Equipment in this area must be suitable for application. Provide panelboards in Mechanical Rooms as required. The design drawings must conform to UFC 3-520-01 and UFC 3-580-01.
D502002.A	Lighting Equipment	-	-	Provide LED lighting fixtures, automatic control is prohibited. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.
D503001.F	Work Area Outlet - Unclassified	1	-	Provide one (1) Category 6A Cabling Drops for Wall Mount Telephone (Includes conduit, box, cabling, jacks, etc.)
D503001.G	Work Area Outlet - Wireless	1	-	Provide two (2) Category 6A Cabling Drops to or above Ceiling Outlet (Includes conduit, box, cabling, jacks, etc.)

5.0 ROOM REQUIREMENTS

7.2 Unit Mechanical

Space Characteristics

Function/adjacencies:
Existing mechanical rooms for the barracks. New finishes.
Room Data Sheet applies to Room Number(s): 134, 153, 164, 226, 245, 258, 326, 345, 358

Special Dimensions:

Ideal Plan Dimensions: 21'-11" W x 14'-1" D (308 sq ft min)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: n/a

Other/Special Requirements:
None

Uniformat Section	Description	Qty	Size	Specific Requirements
B203001.A	Solid Doors	1	6' W x 7' H	Exterior hollow metal double door and frame.
B203008.E	Exterior Door Hardware	-	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301001.A	CMU Wall Finish	-	-	Epoxy painted CMU with a grout or resin finish for uniformly smooth surface.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C302010	Hardeners and Sealers	-	-	Provide sealed concrete.
C3040	Interior Coatings and Special Finishes	-	-	Paint exposed ceiling structure.
D203003	Floor Drains	1	-	Provide floor drain.
D30	HVAC	-	-	Provide heating and air conditioning for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D501090	Other Service and Distribution	-	As Required	Provide general purpose receptacles and mechanical equipment connections. Equipment in this area must be suitable for application. Provide panelboards in Mechanical Rooms as required. The design drawings must conform to UFC 3-520-01 and UFC 3-580-01.
D502002.A	Lighting Equipment	-	-	Provide LED lighting fixtures, automatic control is prohibited. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.

D503001.F	Work Area Outlet - Unclassified	1	-	Provide one (1) Category 6A Cabling Drops for Wall Mount Telephone (Includes conduit, box, cabling, jacks, etc.)
D503001.G	Work Area Outlet - Wireless	1	-	Provide two (2) Category 6A Cabling Drops to or above Ceiling Outlet (Includes conduit, box, cabling, jacks, etc.)

5.0 ROOM REQUIREMENTS

7.4 Plumbing Chase

Space Characteristics

Function/adjacencies:
Existing plumbing chase between barracks in building 1 and 3. One per floor in each building. New finishes.
Room Data Sheet applies to Room Number(s): 114, 158, 206, 252, 306, 352

Special Dimensions:

Ideal Plan Dimensions: 160'-7" W x 3'-0" D (485 sq ft min)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: n/a

Other/Special Requirements:
None

Uniformat Section	Description	Qty	Size	Specific Requirements
B203001	Solid Doors	1	3' W x 7' H	Exterior hollow metal door and frame.
B203008.E	Exterior Door Hardware	1	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C302010	Hardeners and Sealers	-	-	Provide sealed concrete.
C3040	Interior Coatings and Special Finishes	-	-	Paint exposed ceiling structure.
D202001	Pipes and Fittings	-	-	Install new hot and cold piping and fittings to serve new fixtures.
D202002	Valves & Hydrants	-	-	Provide isolation and shut-off valves, provide hose bibbs or wall hydrants where required.
D202004	Insulation & Identification	-	-	Install new supply piping insulation and identification tags where required.
D202090	Other Domestic Water Supply	-	-	Provide pipe supports, inspections, disinfection, and testing.
D203001	Waste Pipe & Fittings	-	-	Install new waste piping to serve new fixtures.
D203002	Vent Pipe and Fittings	-	-	Install new vent piping to serve new fixtures.
D203003	Floor Drains	1	-	Provide floor drain.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.

5.0 ROOM REQUIREMENTS

7.5 Plumbing Chase - BLDG 2

Space Characteristics

Function/adjacencies:
Existing plumbing chase between barracks in building 2. One per floor. New finishes.
Room Data Sheet applies to Room Number(s): 140, 232, 332

Special Dimensions:

Ideal Plan Dimensions: 116'-8" W x 3'-0" D (352 sq ft min)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: n/a

Other/Special Requirements:
None

Uniformat Section	Description	Qty	Size	Specific Requirements
B203001	Solid Doors	1	3' W x 7' H	Exterior hollow metal door and frame.
B203008.E	Exterior Door Hardware	1	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C302010	Hardeners and Sealers	-	-	Provide sealed concrete.
C3040	Interior Coatings and Special Finishes	-	-	Paint exposed ceiling structure.
D202001	Pipes and Fittings	-	-	Install new hot and cold piping and fittings to serve new fixtures.
D202002	Valves & Hydrants	-	-	Provide isolation and shut-off valves, provide hose bibbs or wall hydrants where required.
D202004	Insulation & Identification	-	-	Install new supply piping insulation and identification tags where required.
D202090	Other Domestic Water Supply	-	-	Provide pipe supports, inspections, disinfection, and testing.
D203001	Waste Pipe & Fittings	-	-	Install new waste piping to serve new fixtures.
D203002	Vent Pipe and Fittings	-	-	Install new vent piping to serve new fixtures.
D203003	Floor Drains	1	-	Provide floor drain.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.

5.0 ROOM REQUIREMENTS

7.6 Elevator Machine Room

Space Characteristics

Function/adjacencies:
Room for elevator machine equipment.
Room Data Sheet applies to Room Number(s): 188, 190

Special Dimensions:

Ideal Plan Dimensions: 9'-0" W x 8'-0" D (72 sq ft min)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: n/a

Other/Special Requirements:
None

Uniformat Section	Description	Qty	Size	Specific Requirements
B203001	Solid Doors	1	3' W x 7' H	Exterior hollow metal door and frame.
B203008.E	Exterior Door Hardware	1	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301001	CMU Wall Finish	-	-	High performance painted CMU with a grout or resin finish for uniformly smooth surface.
C301003	Gypsum Wallboard Finishes	-	-	High-performance painted GWB.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C302010	Hardeners and Sealers	-	-	Provide sealed concrete.
C3040	Interior Coatings and Special Finishes	-	-	Paint exposed ceiling structure.
D10	Conveying	2	Minimum 72sq.ft. per Elevator with a Minimum Wall Length of 8'-0"	UFC 3-490-06 > Chapter 3 Architecture > 3-1 Elevator Machine Room
D30	HVAC	-	-	Provide heating and air conditioning for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.

5.0 ROOM REQUIREMENTS

7.7 Fire Protection

Space Characteristics

Function/adjacencies:
Room dedicated to firewater sprinkler system and backflow preventer.
Room Data Sheet applies to Room Number(s): 170A

Special Dimensions:

Ideal Plan Dimensions: 4'-0" W x 12'-0" D (48 sq ft min)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: Walls STC 50, Doors STC 30

Access: Hotel Style Lockset

Number of Occupants: n/a

Other/Special Requirements:
None

Uniformat Section	Description	Qty	Size	Specific Requirements
B203001.A	Solid Doors	1	6' W x 7' H	Exterior hollow metal double door and frame.
B203008.E	Exterior Door Hardware	-	-	Provide entry lockset with access control and integration to Security Office for allow entry.
C103004	Identifying Devices	1	-	Provide room identifying signage complying with UFC 3 120 01.
C301001.A	CMU Wall Finish	-	-	Epoxy painted CMU with a grout or resin finish for uniformly smooth surface.
C301003.A	Gypsum Wallboard Finishes	-	-	Epoxy painted GWB.
C302007	Wall Base Finishes	-	4" Cove	Provide rubber cove wall base.
C302010	Hardeners and Sealers	-	-	Provide sealed concrete.
C3040	Interior Coatings and Special Finishes	-	-	Paint exposed ceiling structure.
D203003	Floor Drains	1	-	Provide floor drain.
D30	HVAC	-	-	Provide heating and air conditioning for temperature control.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.

5.0 ROOM REQUIREMENTS

8.1.1 Covered Walkway - Lobby

Space Characteristics

Function/adjacencies:
Existing exposed walkways between rooms.
Room Data Sheet applies to Room Number(s): EX00

Special Dimensions:

Ideal Plan Dimensions: 4'-8" W
Minimum Ceiling Height: 8'-8" AFF

Acoustics: NA

Access: Open Passage

Number of Occupants: n/a

Other/Special Requirements:
None

Uniformat Section	Description	Qty	Size	Specific Requirements
C103004.A	Identifying Devices	-	-	Provide wayfinding and life safety signage complying with UFC 3 120 01.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D502002.A	Lighting Equipment	-	-	Provide exterior grade LED lighting fixtures. The design drawings must conform to UFC 3-530-01.

5.0 ROOM REQUIREMENTS

8.1.2 Covered Walkway - Building 2

Space Characteristics

Function/adjacencies:
Existing exposed walkways between rooms.
Room Data Sheet applies to Room Number(s): EX01, EX02, EX03

Special Dimensions:

Ideal Plan Dimensions: 4'-8" W
Minimum Ceiling Height: 8'-8" AFF

Acoustics: NA

Access: Open Passage

Number of Occupants: n/a

Other/Special Requirements:
None

Uniformat Section	Description	Qty	Size	Specific Requirements
C103004.A	Identifying Devices	-	-	Provide wayfinding and life safety signage complying with UFC 3 120 01.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D502002.A	Lighting Equipment	-	-	Provide exterior grade LED lighting fixtures. The design drawings must conform to UFC 3-530-01.

5.0 ROOM REQUIREMENTS

8.1.3 Covered Walkway - Building 3

Space Characteristics

Function/adjacencies:
Existing exposed walkways between rooms.
Room Data Sheet applies to Room Number(s): EX01, EX02, EX03

Special Dimensions:

Ideal Plan Dimensions: 4'-8" W
Minimum Ceiling Height: 8'-8" AFF

Acoustics: NA

Access: Open Passage

Number of Occupants: n/a

Other/Special Requirements:
None

Uniformat Section	Description	Qty	Size	Specific Requirements
C103004.A	Identifying Devices	-	-	Provide wayfinding and life safety signage complying with UFC 3 120 01.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D502002.A	Lighting Equipment	-	-	Provide exterior grade LED lighting fixtures. The design drawings must conform to UFC 3-530-01.

5.0 ROOM REQUIREMENTS

8.1.4 Covered Walkway - Building 4

Space Characteristics

Function/adjacencies:
Existing exposed walkways between rooms.
Room Data Sheet applies to Room Number(s): EX01, EX02, EX03

Special Dimensions:

Ideal Plan Dimensions: 4'-8" W
Minimum Ceiling Height: 8'-8" AFF

Acoustics: NA

Access: Open Passage

Number of Occupants: n/a

Other/Special Requirements:
None

Uniformat Section	Description	Qty	Size	Specific Requirements
C103004.A	Identifying Devices	-	-	Provide wayfinding and life safety signage complying with UFC 3 120 01.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D502002.A	Lighting Equipment	-	-	Provide exterior grade LED lighting fixtures. The design drawings must conform to UFC 3-530-01.

5.0 ROOM REQUIREMENTS

8.2 Stairs

Space Characteristics

Function/adjacencies:

Covered exterior stairs for vertical circulation between floors. Stair structure (steps, landings and railings) to be replaced within existing stairwell. All metal stair framing, handrails and stair steps to be painted galvanized metal.

Room Data Sheet applies to Room Number(s): 109, 126, 157, 172, 201, 218, 251, 266, 301, 318, 351, 366

Special Dimensions:

Ideal Plan Dimensions: 11'-0" W x 8'-0" D (88 sq ft min)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: NA

Access: Open Stair

Number of Occupants: n/a

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
C103004.A	Identifying Devices	-	-	Provide wayfinding and life safety signage complying with UFC 3 120 01.
C302008	Stair Finishes	-	-	Provide exterior grade resilient stair treads with grip inserts.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D502002.A	Lighting Equipment	-	-	Provide surface mounted LED lighting fixtures with automatic control in stairs. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.

5.0 ROOM REQUIREMENTS

8.3 Elevator

Space Characteristics

Function/adjacencies:
Elevator cab for vertical circulation with enclosed glass storefront lobby on each level.
Room Data Sheet applies to Room Number(s): 187, 189, 250, 282, 381, 382

Special Dimensions:

Ideal Plan Dimensions: 9'-0" W x 7'-0" D (63 sq ft min)
Minimum Ceiling Height: 8'-0" AFF

Acoustics: NA

Access: NA

Number of Occupants: n/a

Other/Special Requirements:
None

Uniformat Section	Description	Qty	Size	Specific Requirements
B203002.A	Glazed Doors	1	3'Wx7'H	Exterior storefront single door and frame
C103004.A	Identifying Devices	-	-	Provide wayfinding and life safety signage complying with UFC 3 120 01.
C301090	Other Wall Finishes	-	-	Provide elevator manufacturer's plastic laminate wall panels and brushed stainless steel trim. Provide manufacturer's full range of color offerings. Provide decorative brushed stainless steel metal hand rails.
C302004	Resilient Floor Finishes	-	Plank Tile	Provide water-resistant luxury vinyl tile. Length to be at least 3 times the width.
C303090	Other Ceiling & Ceiling Finishes	-	-	Provide Elevator manufacturer's typical metal ceiling panel.
D202090	Other Domestic Water Supply	-	-	Provide pipe supports, inspections, disinfection, and testing.
D203004	Sanitary & Vent Equipment	1	-	Provide sump pump.
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D501090	Other Service and Distribution	-	As Required	Provide general purpose receptacles and elevator equipment connections. Equipment in this area must be suitable for application. The design drawings must conform to UFC 3-520-01 and UFC 3-490-06.
D502002.A	Lighting Equipment	-	-	Provide LED lighting fixtures, automatic control is prohibited. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.

5.0 ROOM REQUIREMENTS

8.4 Vestibule

Space Characteristics

Function/adjacencies:

Elevator vestibule to protect the elevator and passengers from the elements at each level. Elevator lobby is enclosed with aluminum frame and glass storefront with an aluminum framed glass door. Flooring to be polished concrete, slip resistant and ceiling is moisture resistant gypsum wall board. Door is push/pull hardware with a closer.

Room Data Sheet applies to Room Number(s): 187A, 189A, 249, 281, 381A, 382A

Special Dimensions:

Ideal Plan Dimensions: 9'-0" W x 7'-0" D (63 sq ft min)
Minimum Ceiling Height: 8'-8" AFF

Acoustics: NA

Access: Always Open

Number of Occupants: n/a

FF&E Information for Coordination:
FF&E and AV Equipment will be funded separately as a bid option to the construction contract. Infrastructure to support all FF&E and AV must be included in the construction contract. Contractor's Interior Designer must validate and determine FF&E requirements based on in-depth interviews with Activity at Concept Design Workship (CDW). Space will accommodate, at a minimum, the following:

FF&E: Provide waste bin.

Other/Special Requirements:

None

Uniformat Section	Description	Qty	Size	Specific Requirements
B203002.B	Storefront Glazing Units	3		Exterior aluminum frame and glazed storefront window units for enclosed elevator lobby
C103004.A	Identifying Devices	-	-	Provide wayfinding and life safety signage complying with UFC 3 120 01.
C301001	CMU Wall Finish	-	-	High performance painted CMU with a grout or resin finish for uniformly smooth surface.
C301003	Gypsum Wallboard Finishes	-	-	High-performance painted GWB.
C302004	Resilient Floor Finishes	-	Plank Tile	Provide water-resistant luxury vinyl tile. Length to be at least 3 times the width.
D30	HVAC	-	-	Provide heating for temperature control
D40	Fire Protection	-	-	Provide automatic sprinkler protection in accordance with UFC 3-600-01 and NFPA 13. Provide fire alarm and mass notification system (initiating devices and notification appliances) in accordance with UFC 3-600-01 and UFC 4-021-01.
D5020	Lighting and Branch Wiring	-	-	Provide LED lighting fixtures and automatic control, and emergency lighting. Emergency lighting fixtures via battery pack or central lighting inverter. The design drawings must conform to UFC 3-530-01.

6.0 ENGINEERING SYSTEMS REQUIREMENTS

A F
A e e C c
S pe c e
E e E c e

C I e C c
C S
C I e F e
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E F
F Se ec e e
S e P ep
S e I p e e
S e C ec c e
S e E ec c e

6. ENGINEERING SYSTEMS REQUIREMENTS

A10 FOUNDATIONS

SYSTEM DESCRIPTION

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

See Engineering Systems Requirements (ESR) Section B10, *Superstructure*, for additional loading criteria.

A10 GENERAL

GOVERNMENT PROVIDED GEOTECHNICAL INFORMATION

Subsurface soil information is provided in Part 6 Attachments.

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

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

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

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

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

Observed site conditions which may present a challenge during design/construction include - The soils that will be exposed after completion of stripping will be soft and at or near the groundwater

elevation. Anticipate these marginal subgrade support conditions and incorporate measures into the design and construction procedures to obtain required soil support while maintaining progress for completion on schedule.

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

SEISMIC DESIGN

A site-specific seismic ground motion study is required. Determine the Seismic Site Classification in accordance with UFC 3-301-01, *Structural Engineering*. A site-specific seismic ground motion study is not required; however, the initial seismic site classification of DE must be confirmed in accordance with UFC 3-220-01 as the design progresses.

A1010 STANDARD FOUNDATIONS

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

Contractor must submit a program for monitoring the effects of deep foundation installation on adjacent structures to the Contracting Officer for approval. As part of the monitoring program, the Contractor must be responsible for reviewing and documenting the conditions of the existing adjacent buildings prior to foundation construction. The program must include locations and quantity of monitoring points for vibration and settlement on existing buildings and/or facilities near the proposed site(s) during deep foundation installation. If the effects reported are unacceptable to the Contracting Officer, the Contractor will be responsible for mitigating vibration and settlement (for example, predrilling driven piles).

A101001 DEEP FOUNDATIONS

As determined by the Designer of Record to be applicable, provide a deep foundation system consisting of piles. To allow for attachment of dynamic testing equipment and to allow for potential deeper pile tip bearing elevations due to variability of subsurface conditions, driven test piles must be at least 10 feet longer than the anticipated production pile length. A foundation system using pile

caps and grade beams must be provided for the referenced structures. Foundation material must be compatible with the environment. Material protection for elements exposed to corrosive soils or chlorides must be provided in accordance with ACI 318 or AISC requirements.

The pile axial compressive and tensile capacities must be determined and compared using three different analytical methods. In-situ testing (i.e. cone penetrometer, dilatometer, etc.) will be used develop geotechnical parameters for design. Upper and lower bound pile capacities must be evaluated based on variations in subsurface conditions at the site. Time dependent pile capacity conditions (i.e. pile setup); group effects, installation sequencing, refusal driving conditions, etc. will be evaluated and addressed, as applicable.

The allowable stresses for piles must not exceed those limitations specified in IBC Section 1810 Deep Foundations. The following tolerances must be used in design of the foundation system:

i. Total settlement of deep foundations is limited to ½ inch under service load conditions as determined by static or dynamic pile load testing, unless the pile design allowable capacity is under 25 tons. If the pile design allowable capacity is less than 25 tons, then total pile settlement must be estimated based on established analytical methods.
ii. Acceptable differential settlement is defined as an angular distortion of less than 1/500 between two pairs. The angular distortion is defined as the difference in settlement between two points divided by the distance between the points.
iii. Lateral deflection of deep foundations is limited to ¼ inch with an axial load equal to the expected dead loads.
iv. Acceptable factor of safety associated with liquefaction potential must meet or exceed Table 2-1 in UFC 3-220-01.
v. Allowable loads of deep foundation elements must incorporate the factors of safety provided in UFC 3-220-01 Table 2-2 and 2-3.

The project structural engineer of record will design and detail the pile foundations in accordance with IBC Section 1810.3. The pile structural calculations and details will be submitted to the Government for review and approval during the project design development.

To lessen potential pile damage during driving and to reduce near surface ground vibrations, pre-augering to a depth of 10 feet below the existing ground surface will be required at each test pile and production pile locations.

A pre-construction and post-construction condition survey must be performed for all existing structures within 200 feet (plan horizontal distance) from any proposed pile driving locations. The condition survey must document any existing cracks and other significant defects on adjacent structures both before and after pile installation. Vibration monitoring must be performed continuously during the test pile and production pile installation at any existing building structures located within 200 feet of pile driving activities. A minimum of two seismographs must be used during vibration monitoring. Pile installation procedures must be modified as necessary to limit vibrations to less than 0.5 inches per second, resultant peak particle velocity (RPPV), recorded at, or slightly below, the ground surface adjacent to exterior walls of nearby structures (reference USBM RI 8507 *Structure Response and Damage Produced by Ground Vibration from Surface Mine Blasting*).

A test pile program must be overseen by the Geotechnical Engineer of Record and a final signed and stamped report must be submitted to the Government for review and approval.

All driven test piles will be dynamically monitored during installation and hammer restrikes in accordance with ASTM D4945, “Standard Test Method for High-Strain Dynamic Testing of Piles.” The ultimate load capacity of each test pile must be evaluated using CAPWAP analyses. Perform pile static load test(s) as recommended by the Contractor’s Geotechnical Engineer and as required by all applicable building codes. Additional load test requirements are stated in Part 4 of this RFP.

A1020 SPECIAL FOUNDATIONS

As determined by the Designer of Record to be applicable, provide a Special foundation for the pre-engineered metal building. "Special Foundations" are any foundations that are not specifically "Standard Foundations", or a combination of Standard Foundations and a site improvement/ground modification system. Examples of special foundations are site improvement/ground modification systems include surcharging, stone columns, rammed aggregate piers, impact densification, compaction grouting, vibro-flotation, etc. As "Special Foundation" techniques or systems typically require the use of specialty contractors, a Professional Engineer must establish installation and acceptance criteria and supervise the installation. The Designer of Record must submit justification for use, including acceptable evidence of previous successful installation in similar conditions, methods and equipment used in their installation, proposed testing and inspection to be used, supporting test data, calculations and any other information related to the structural properties and load capacity of such system. The allowable stresses for piles/piers must not exceed those limitations specified in IBC Section 1810 Deep Foundations.

Special foundations may consist of the installation of micropiles, helical piles are not permitted. Pile locations must be adequately spaced to allow for proper transfer of any existing and new loads to the ground while limiting total axial deflection to less than ½ inch under service load conditions. Lateral deflection of micropile systems must be limited to ¼ inch with an axial load equal to expected dead loads.

Submit design data and supporting calculations during project design development for Government approval. Submittal must include outside diameter of steel casing, wall thickness of steel casing, length of steel casing, type of steel casing material, full-length center reinforcing bar, length of uncased micropile section, diameter and length of bond zone and grout type and compressive strength. Design must be stamped by a Professional Engineer (Pile Designer of Record) registered in the state of the project who is experienced with micropile foundations. The design must be completed by a registered Professional Engineer(s) to evaluate both the geotechnical and structural pile capacities. The structural engineer of record will design and detail the micropile foundations in accordance with IBC Section 1810.3 and the pile top to foundation connections using the procedures contained in FHWA NHI-05-039. The pile structural calculations and details will be submitted to the Government for review and approval during the project design development. Micropile locations must be shown on the project structural foundation plan sheets and a micropile specification section must be included in the project specifications.

The design axial compressive load capacity of micropile systems must be verified by load testing in accordance with the procedures outlined in ASTM D1143M-07 (Reapproved 2013). At least one pile location for each ten production pile locations, or fraction thereof, must be selected for load testing by the Pile Designer of Record. Test pile installation and load test procedures must be monitored by an independent testing agency with demonstrated experience with design, installation and testing of micropiles. The bidding contractor must include costs associated with all labor and equipment necessary to accomplish the testing in their bid.

The maximum applied load during testing must be at least two times the design working load under service conditions. The results of load testing must demonstrate a maximum net axial deflection of 0.5 inches under the applied service (i.e. working) load. The results of acceptable load testing must be used in conjunction with the measured installation torque to verify design termination and acceptance criteria.

A load test report must be submitted for government review within 3 days following test completion. The report must be stamped by the Pile Designer of Record and must include, but not limited to, the following information:

Name of Project and Installing Contractor

Name of independent testing agency and representative present during testing
Date and time of both test pile installation and load testing
Micropile type and configuration of all components
Test pile location number and location identification
Grout compressive strength at time of load testing of the micropile system
Pertinent test pile installation information (i.e. pile length, tip elevation, cut-off elevation, torque measurements, inclination angle, etc.)
Description of the load test equipment and test set-up
Certified calibration records of load test equipment
Time and deflection measurements at each load increment
Cumulative axial deflection of pile at each load increment.

Installation of production piles must not commence until the load test submittal has been submitted and approved in writing by the Contracting Officer. All costs associated with work performed prior to approval by the Contracting Officer is the responsibility of the Contractor.

A1030 SLAB ON GRADE

As determined by the Designer of Record, provide a concrete slab on compacted crushed stone to minimize settlement and to ensure the stability of the structure. Placement of concrete slabs on uncontrolled fill is not acceptable. Total post construction settlement of the slab must be limited to ¼ inch. Where slab on ground is below the existing adjacent exterior grade, provide water/damp proofing and a perimeter drainage system to remove ground water from the area immediately adjacent to the buildings. Provide perimeter and under slab insulation in accordance with UFC 3-101-01.

A1040 STRUCTURALLY SUPPORTED SLAB

As determined by the Designer of Record to be applicable, a structurally supported slab must be provided to support all utilities that could be adversely affected by soil consolidation or expansive soils. The total post-construction settlement of the slab must not exceed ¼ inch. Use stainless steel support hangers that are adequately sized and spaced to support the utilities during operation. Flexible connections are required to manage differential settlement between the structurally supported utility lines and the soil-supported utility lines at service connections outside the building's footprint. For slabs located below the adjacent exterior grade, provide both water/damp proofing and a perimeter drainage system to remove groundwater from the area immediately surrounding the building. All perimeter and under-slab insulation must be in accordance with the standards set by UFC 3-101-01,
Architecture.

The existing drawings provided in Part 6 – Attachments indicate the existing ground floor slab consists of precast concrete planks spanning between grade beams.

6. ENGINEERING SYSTEMS REQUIREMENTS

A20 BASEMENT CONSTRUCTION

SYSTEM DESCRIPTION

Provide the basement construction in accordance with Unified Facilities Criteria (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 and insulation of basement walls.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

B10 SUPERSTRUCTURE

SYSTEM DESCRIPTION

The superstructure consists of structural elements above the foundation that provide support for vertical loads and resistance to lateral loads.

This section includes the requirements for the superstructure of the building, including floor and roof framing, columns, interior load-bearing walls and the main lateral-force resisting system. Exterior load bearing walls are addressed in Section B20.

Provide the building framing system in accordance with Unified Facilities Criteria (UFC) 3-301-01, *Structural Engineering*.

Importance Factors

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

Seismic Design Category

The Seismic Design Category is A.

Wind Exposure

Base wind on Exposure D.

B1010 FLOOR CONSTRUCTION

The floor construction may include any structural framing system meeting the requirements of this section.

The existing drawings provided in Part 6 – Attachments indicate the existing floor construction for the interior spaces consists of precast concrete plank spanning between load-bearing CMU walls, and precast concrete plank spanning between steel framing for the exterior corridors.

B1020 ROOF CONSTRUCTION

The roof construction may include any structural framing system meeting the requirements of this section.

The existing drawings provided in Part 6 – Attachments indicate the existing roof construction above the interior spaces consists of precast concrete plank spanning between the load-bearing walls, and precast concrete plank spanning between steel framing for the exterior corridors.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

B20 EXTERIOR ENCLOSURE

SYSTEM DESCRIPTION

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

GENERAL SYSTEMS REQUIREMENTS

B2010 EXTERIOR WALLS

The building is existing to remain. The structure is load-bearing concrete masonry walls (CMU) with a brick veneer around the exterior. The flooring/decking in the sleeping units is prestressed concrete panels bearing on CMU walls between the rooms. There are open walkways that are precast concrete flooring and decking with precast concrete railings and steel columns. The existing to remain wall is estimated wall u-value ~0.12 (per as-builts and u-value calcs) and the new wall requirements are to be maximum U-0,055 per u-value calculations.

B201001 EXTERIOR CLOSURE

Provide Exterior Closure system as described below.

At sleeping unit entries provide metal stud walls with insulation and brick veneer. Provide doors, frames, and windows per concept plans included in Part 6, Attachment W.

B201002 EXTERIOR WALL BACKUP CONSTRUCTION

Provide Exterior Wall Back-up Construction System (back-up systems for Exterior Closure) including concrete masonry units(CMU) with brick veneer wall systems with insulation when integral with expansion control 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

Provide continuous insulation, vapor retarder, water-resistive barrier, and air barrier to meet or exceed requirements of project's energy savings requirements as indicated by applicable American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) 90.1 calculations called for in Unified Facilities Criteria (UFC) 1-200-02, *High Performance and Sustainable Building Requirements*, and meeting minimum building envelope insulation requirements of UFC 3-101-01, *Architecture* within the area of work. Upgrade to existing air barrier not required.

Provide a continuous air barrier to control air leakage into, and out of conditioned spaces within the

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

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

Buildings envelope seals from the interior: Utilize an aerosol-applied, waterborne acrylic sealant and associated accessories for sealing, adhesion, and equipment for a full and complete application. Must be non-toxic, meet sustainability requirements and installed per manufacturers instructions. Basis of design product: AeroBarrier x1 as manufactured by Aeroseal, 225 Byers Road, Miamisburg, OH 45342, (937) 428.9300 www.aeroseal.com/aerobarrier.

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

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

1. Typical conditions at wall sections.
2. Barrier treatment at wall openings.
3. Intersections with other exterior enclosure assemblies and materials. Include intersections at roof and floors.
4. Intersections with counter flashing.
5. Inside and outside corners.
6. Preservation of air and water tightness at anchors for materials that cover the barrier.
7. Treatment to seal barrier penetrations such as conduits, pipes, electric boxes, and fixtures.
8. Indicate air barrier perimeter, if facility is segmented into areas that are not within the air barrier envelope.

B201004 PARAPETS

Parapets are existing to remain precast concrete panels. Where metal coping exists on the parapet it is to be replaced when the roofing is replaced.

B201005 EXTERIOR LOUVERS & SCREENS

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

B201006 BALCONY WALLS & HANDRAILS

Exterior open walkway precast railings to remain. Handrails in stairwells will be provided and installed

as new.

B201007 EXTERIOR SOFFITS

Provide exterior vinyl soffit system. All exposed metal trims, fasteners, or other components must be corrosion-resistant materials.

B201009 EXTERIOR PAINTING AND COATINGS

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

All finishes and coatings must be corrosion-resistant.

B201010 EXTERIOR JOINT SEALANTS

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

B201012 SCREEN WALL

Provide screen walls to screen mechanical units, electrical substations, loading docks, and trash receptacles. Provide screen walls compatible with the exterior architecture of the building.

B2020 EXTERIOR WINDOWS

Provide windows in each area of the buildings that is regularly occupied, to enhance the working environment, without compromising visual acuity and comfort. Natural daylighting is preferred. Exterior windows must be prefinished aluminum. If approved by the DOR, the sample window may be installed in an opening in a framed wall, and the mock-up may be left during construction as a cut-away of the installation.

For masonry walls, install the sample window in the existing masonry wall.

B202001 WINDOWS

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

Provide aluminum operable and fixed windows with a maximum assembly U-0.42, SHGC-0.25

Provide integral insect screens for all operable windows.

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

B202002 STOREFRONTS

Provide aluminum storefronts.

B202004 EXTERIOR GLAZING

Provide glazing to match existing adjacent buildings and Installation Appearance Plan. Provide insulated glazing that is bird collision-resistant.

B2030 EXTERIOR DOORS

Provide solid door assemblies. Exterior doors and frames must be non-corroding pre-finished galvanized steel. Provide Heavy Duty Doors - American National Standards Institute/Steel Door Institute (ANSI/SDI) A250.8, Level 2, physical performance Level B, Model 1.

In accordance with NFPA and UFC requirements provide rated doors in fire rated assemblies.

B203001 SOLID DOORS

At sleeping rooms provide hollow metal door assemblies other than at main storefront/curtainwall entrances including prefinished heavy-duty, non-corroding, insulated doors with frames and hardware.

At support spaces, including doors for mechanical rooms, laundry rooms, storage, training rooms, etc. Provide solid core metal doors, heavy-duty, non-corroding, insulated with frames and hardware.

B203002 GLAZED DOORS

Provide Exterior Glazed Doors and Entrances System including factory-finish aluminum framed door assemblies with insulated, tinted glazing, frames, and hardware compatible with other 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 barrack sleeping units with hotel style locksets.

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

Provide door hardware finish of stainless steel.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

B30 ROOFING

B30 GENERAL SYSTEM DESCRIPTION

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

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

Provide a Pre-Design Roofing Conference and Pre-Roofing Conference to assure roof design and construction is properly coordinated before construction begins.

The existing roof drainage system will remain as part of the roof design on all buildings. Refer to Unified Facilities Criteria (UFC) 3-110-03, *Roofing*, UFC 3-101-01, *Architecture*, and UFC 1-200-02, *High Performance Sustainable Building Requirements* for additional roofing requirements.

B3010 ROOF COVERINGS

Provide a roofing system that resists wind uplift pressures calculated in accordance with American Society of Civil Engineers (ASCE) 7. Uplift resistance must be validated by applicable Factory Mutual (FM), Underwriters Laboratories (UL) or American Society for Testing and Materials (ASTM) uplift resistance test procedures.

B301002 LOW SLOPE ROOFING SYSTEMS

Wind Uplift - Provide a complete roof covering assembly rated Class 1- 60 or appropriate in accordance with Factory Mutual (FM) P7825, capable of withstanding an uplift pressure of 60 pounds per square foot (with a safety factor of 2) and FM 1-49 for perimeter and flashing attachment.

Fire Safety - Provide a complete roof covering assembly:

1. Rated Class A in accordance with ASTM E 108.

2. Listed as part of Fire-Classified roof deck construction in UL Roofing Materials and Systems Directory (RMSD).

Low slope roofing systems that are acceptable include aggregate surfaced four-ply built-up roofing, three-ply built-up roofing systems with modified bitumen cap sheet surfacing three-ply modified bitumen roofing or EPDM.

Cool Roof - Meet the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) 90.1 Chapter 5 values for cool roofing. If a cool roof is not selected in zones 1-3, meet one of the exception requirements listed in ASHRAE 90.1 Chapter 5 or provide thermal insulation above the deck with an R value of 33 or greater.

B301003 ROOF INSULATION AND FILL

Provide roof insulation values no less than in accordance with UFC 1-200-02, *High Performance and Sustainable Building Requirements* and UFC 3-101-01, *Architecture*. Provide a minimum R-value roof as determined by the LCCA/Energy model of R-30.

For fastening roof insulation on low-slope membrane roofs, place fasteners to withstand and obtain an uplift pressure of 60 pounds per square foot (with a safety factor of 2) in the field of the roof and FM Loss Prevention Data Sheets (LPDS) 1-49 for perimeter component and flashing attachment.

B301004 FLASHINGS AND TRIM

Flashing and sheet metal work includes scuppers, and splash pans. Flashings must be copper, sheet and strip - ASTM B 370, cold-rolled temper and a minimum zinc coat weighting of 275 g/sm (90 ounces per square foot). Galvanized steel items must have a baked-on, factory applied finish of polyvinylidene fluoride or an equivalent fluorocarbon coating Steel Sheet, Aluminum Zinc-coated - ASTM A792/A792M, minimum of 0.70 mm (24 gauge).

B301005 GUTTERS AND DOWNSPOUTS

Provide gutters and downspouts compatible with roofing material and finish. Concealed (interior) gutters and downspouts are prohibited. Gutters and downspouts will occur in the same places as existing.

B301006 ROOF OPENINGS AND SUPPORTS

Existing roof hatches will be replaced. No equipment is located on the roof. Provide guard rails as needed for general maintenance.

B301090 OTHER ROOFING

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

Provide new roof drains, scuppers and accessories in existing locations. Provide compatible flashing materials, a new drain clamping ring and new bolts for anchorage.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

C10 INTERIOR CONSTRUCTION

SYSTEM DESCRIPTION

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

Provide durable construction appropriate for the building function. Acoustic properties of materials, as well as durability, must be considered during material selection.

GENERAL SYSTEM REQUIREMENTS

Areas of the Project subject to abuse require that "impact resistant" systems be provided. See "Room Requirements" for specific requirements on "Partitions", "Interior Doors", and "Fittings".

C1010 PARTITIONS

Refer to Part 3 Section 5.0, Room Requirements for partition requirements for individual rooms. Where rooms with different partition requirements adjoin one another, provide a combined wall type that meets the security and durability as well as finish requirements of both spaces.

All interior partitions must be constructed of metal studs with gypsum board on each side.

C101001 FIXED PARTITIONS

Provide fixed interior partitions that extend from finish floor to underside of structure above.." Sound-rated partition assemblies must have a minimum Sound Transmission Coefficient (STC) of 36 in accordance with American Society for Testing and Materials (ASTM) E 90 or ASTM E 413 for frequency data.

C101006 GLAZED PARTITIONS & STOREFRONTS

Provide glazed storefront system.

C1020 INTERIOR DOORS

C102001 STANDARD INTERIOR DOORS

Refer to Part 3 Section 5.0, Room Requirements for door requirements for individual rooms. Where rooms with different door requirements are connected by a door, provide a door type that meets the security and durability as well as finish requirements of both spaces.

Interior doors must be flush wood. All interior door frames must be hollow metal.

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

Veneer for flush doors must be birch in slip match.

Doors must have Factory Finish of AWI Quality Standards Section 1500, specification for Conversion

varnish alkyd urea.

Provide 39 STC sound rated door and standard hollow metal door frame with continuous sound/ weather seals around the door to create a sound control door. Provide sound/ weather seals at the top and both sides that are integral with the door frame and drop-down door bottom sound/ weather seals must rest on a metal threshold. After installation, test the doors with a flashlight to determine if any gaps in the sound seals allow light to be viewed on the opposite side of the door.

C102007 INTERIOR DOOR HARDWARE

Provide Hotel Style Lockset door hardware at Administration Building. Sleeping rooms, and support spaces per the Room Data Sheets.

Provide locksets that are American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA) A156.13, Series 1000, Grade 1, mortise, cylindrical locks, tamper resistant, Underwriters Laboratories (UL) listed with 1 inch throw deadbolt, 3/4-inch throw latch bolt, auxiliary dead-locking latch, and 2-3/4 inch backset.

Provide stainless steel door hardware finish.

C1030 SPECIALTIES

C103001 COMPARTMENTS, CUBICLES, & TOILET PARTITIONS

Provide solid plastic (HDPE) 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 as indicated in Chapter 3, “Room Requirements” portion of this RFP.

Provide brushed stainless-steel toilet and bath accessories to include toilet tissue dispensers, paper towel dispensers, paper towel/waste dispensers, sanitary napkin disposals, towel bars, grab bars, robe hooks, mirrors, soap dispenser and high efficiency electric hand dryers.

Shower curtain rods must be mounted at height to accommodate a standard 72" length shower curtain.

Coordinate mounting heights and hardware with wall tile design and grout lines to avoid drill through tiles.

Coordinate specification based on end user's current contracted vendor-provided products including but not limited to soaps, towels, toilet paper, etc.

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.

Marker boards must have stained wood or anodized aluminum trim to match interior wood and other finishes where indicated in the Room Requirements. Marker boards must be magnetic porcelain on steel writing surfaces and must have a tack-able strip along the top edge, map hooks, and a tool tray.

Marker boards must have tool trays and one set of tools provided for each board. Coordinate with building construction to include appropriate blocking or structural support for the installation of marker boards.

C103004 IDENTIFYING DEVICES

Provide interior room identification signs on each entrance to each interior room. Provide signage to identify each space by room number and name. Signage for general office areas must have changeable room name sections to accommodate personnel and functional changes.

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

C103007 FIRE EXTINGUISHER CABINETS

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

C103008 COUNTERS

Provide solid acrylic counter tops and back splashes.

C103009 CABINETS

Provide cabinetry and millwork items with associated accessories. Cabinetry must be Architectural Woodwork Institute (AWI) custom grade and have concealed hinges with adjustable standards for shelves. All exposed surfaces must be covered with high pressure plastic laminate.

Provide specific cabinetry and storage as noted in Part 3, Chapter 5 Room Requirements.

C103010 CASEWORK

Provide specific casework as noted in Part 3, Chapter 5 Room Requirements.

C103011 CLOSETS

Provide closet rods and organizers as noted in Part 3, Chapter 5 Room Requirements.

C103012 FIRESTOPPING PENETRATIONS

“Firestopping Installer Qualifications - The Firestopping Contractor or Installer must meet the requirements of item a or b below:

a. FM Research approved in accordance with FM 4991, operating as a UL Certified Firestop Contractor.
b. The Firestopping Installer must:

1) Be Certified, licensed, or otherwise qualified by the firestopping manufacturer as having the necessary training; and
2) Have a minimum of 3 years' experience in the installation of the manufacturer's products in accordance with specified requirements. Submit documentation of this experience. The documentation must include at least three projects (one per year) with the types of firestopping systems installed and identify manufacturer of the products used. The Installer must have been certified during performance of those installations; and
3) Trained by a direct representative of the manufacturer (not distributor or agent) in the proper selection and installation procedures of the manufacturer's products. The Firestopping Installer must be obtained from the manufacturer and submit written certification of training and retain proof of certification for duration of firestopping installation. The credentials must reflect that the individual is trained and certified for installing products. Basic training in firestopping systems, materials or selection does not satisfy these requirements. A “wallet card” provided by the manufacturer after 1-2 hours of training does not establish qualifications or credentials. A manufacturer's willingness to sell its firestopping products to the Contractor or to an installer engaged by the Contractor does not in itself confer Firestopping Installer Qualifications on the buyer.

There must be a single qualified firestopping contractor or installer for the entire project. Multiple qualified Installers employed by the same qualified firestopping organization will be permitted. Each Installer's qualifications must be approved by the Government. When multiple Installers are submitted, identify the systems by trade or discipline for which each Installer will be responsible.

The project is required to use the NAVFAC MIDLANT regional specification for Firestop Systems, section 07 84 00.00 22, see attachment in part 6 for example. Contact NAVFAC DFPE for specification .sec file to edit during the design phase.”

C103013 SPRAYED FIRE-RESISTIVE MATERIALS

Provide medium-density or high-density cementitious sprayed fire-resistive materials, or intumescent thin-film coating, to the building's structural framing components as required by Building Code to prevent structural failure.

C103014 ENTRANCE FLOOR GRILLES AND MATS

Provide loose lay floor mats at main building entrances.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

C20 STAIRS

SYSTEM DESCRIPTION

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

GENERAL SYSTEMS REQUIREMENTS

C2010 STAIR CONSTRUCTION

C201001 EXTERIOR STAIRS

Provide exterior stairs constructed of galvanized steel.

Steel stairs must be primed and painted with corrosion-resistant coatings.

C201090 HANDRAILS, GUARDRAILS, AND ACCESSORIES

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

Provide resilient stair treads with grip inserts on all steps.

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

Handrails, guardrails, and accessories must be constructed of galvanized steel, primed and painted with corrosion-resistant coatings.

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

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

C30 INTERIOR FINISHES

SYSTEM DESCRIPTION

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

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

Color selections require the use of wall and floor finish material accents to enhance the color and appearance of the interior design. Provide a wall and floor color design 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 Part 3 Chapter 5 "Room Requirements" for specific requirements on "Interior Finishes."

C3010 WALL FINISHES

All interior wall finishes are indicated in the “Room Requirements” portion of this RFP

C301001 CONCRETE WALL FINISHES

All interior concrete and CMU wall finishes shall be as indicated in the "Room Requirements" portion of this RFP.

C301002 PLASTER WALL FINISHES

Existing walls with plaster finish, either altered or requiring repair, shall be plastered smooth (no visible joints or cracks) and painted.

C301003 GYPSUM WALLBOARD FINISHES

Refer to Chapter 5 "Room Requirements" for spaces requiring gypsum board and for gypsum board performance/type requirements.

Gypsum wall board to be 5/8-inch Type X throughout unless noted otherwise. Moisture-resistant gypsum wall board must be used in all wet or humid areas including, but not limited to vestibules, toilet rooms, laundry rooms, and shower areas. Gypsum walls, fascias, and soffits must receive latex primer and two coats of Architectural Latex in a satin or eggshell finish. See Part 4, C3040 INTERIOR COATINGS AND SPECIAL FINISHES for more information.

C301004 TILE AND TERRAZZO WALL FINISHES

Refer to Chapter 5 "Room Requirements" for spaces requiring tile finish.

Porcelain Tile: Provide through body, impervious porcelain wall tile with manufacturer recommended

minimum width grout joints. Tile must be minimum Grade B, per ANSI 137.1 (2022), with a wide range of accent colors available. Wall tile must extend from the floor to the ceiling. Provide grouted-in stainless steel edge protection strips at all outside and inside corners, stainless steel transition strips where wall tile and floor tile meet, and transitions from tile to other wall finishes.

C301005 WALL COVERINGS

Corner Guards must be used outside corners in corridors and high impact spaces and in spaces as identified in Part 3 Chapter 5 Room Requirements and must be 2” width. They must be surface-mounted in a through-color, recycled, extruded PETG in matching color to adjacent wall material. Corner guards must extend from floor to ceiling and be mechanically installed with a concealed continuous aluminum retainer. Double stick tape and adhesive mounted corner guard methods are not acceptable.

C301090 OTHER WALL FINISHES

Provide as indicated in the "Room Requirements" portion of this RFP.

Solid Surface Wall Finishes: Provide Acrylic Polymer with small size particulate solid surface material. Provide solid surface wall surfaces above solid surface countertops at break rooms, kitchens and lounges. Provide 1/4" thick solid surface wall panels extending entire width of the cabinetry/countertop, and from the countertop to the underside of wall cabinets. Solid surface wall material shall match the pattern and grade of the countertops used in these areas.

Solid surfacing at Showers: 1/4” Solid surfacing wall panels shall extend vertically from top of shower pan to 84” high and shall surround the shower enclosure. Solid surface material will overlap top of shower pan with an air gap, as required. Wall panels in showers will extend horizontally beyond the “wet area”, to the exterior line of the shower receptor threshold. A solid surface transition will be required where solid surface meets wall tile. Locate wall panel seams at corners only. No material seams will be acceptable, except at corners. All shower seams at corners will be lap joints with solid surface corner trim from floor to ceiling. Epoxy seams to match solid surfacing material. Include an integral shower shelf in each shower compartment. Full height solid surface transitions must be provided at adjacent wall surfaces. Substrate behind solid surface shower walls will be as per manufacturer’s requirements. Solid surface shower receptors must be installed prior to wall system. Shower pan receptors will be a minimum thickness of ½” thick, with a ¾” thick area at least 12” in diameter at the drain. Receptors will be custom size depending on the overall shower size requirement and ABA requirements. Solid surface wall finish must include manufacturer recommended fasteners/adhesives/sealants/caulk to complete and match the installation.

C3020 FLOOR FINISHES

Provide floor finishes as indicated in Part 3 Chapter 5 Room Requirements portion of this RFP.

C302001 TILE FLOOR FINISHES

Provide a tile flooring system where noted in Chapter 5, "Room Requirements".

Provide through-body, rectified porcelain tile with matching 6 inch high base where indicated. Grout joints in a maximum width of 3/16 inch must be provided. Tile shall be non-slip, with a light texture. Texture of tile must be analyzed with regard to maintenance and selected based on a minimal maintenance program. Provide grouted-in stainless steel metal transition strips at expansion joints, corners (inside and outside), and transition between floor and wall tile.

Provide coordinating grout for all tile finishes. Provide epoxy grout for all tile finishes.

C302004 RESILIENT FLOOR FINISHES

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

Provide resilient static dissipative VCT (SDT) flooring in areas as indicated for floors with high durability, low maintenance, high slip-resistance requirements to control static in the room. SDT must be of commercial grade with through pattern and an antistatic additive, and must be installed according to manufacturer's instructions.

Provide resilient luxury vinyl tile, in areas as indicated for floors with high durability, low maintenance, and high slip-resistance requirements. Luxury vinyl tile will be planks as indicated in Part 3 Chapter 5 Room Requirements. Luxury Vinyl Tile Flooring spec must fall under Product Classification Class III, Type B per ASTM F1700 and use Class III printed film that conforms to ASTM F1700. Products must not contain ortho-phthalates, must have a minimum overall thickness of 2.5mm and must have a minimum Coefficient of Friction of >0.5. All products must be from manufacturer's standard running line offering. Custom products or products with a minimum order quantity are prohibited.

20 mil, 30 mil and 40 mil wear layer products will be accepted if they have the following characteristics: factory applied UV-cured polyurethane finish containing anti-scratch particles and anti-scuff qualities, a test result of B1 or B2 on the Martindale Procedure B Test - BS EN 16094:2012 Procedures B (which assesses the scratch performance of the topical factory applied finish treatment that enhances clean ability and durability), passes ASTM F970 for Static Loads resulting in Pounds per Square Inch (PSI) minimum of 1000 PSI (to avoid materials that have the potential to severely indent and/or break with heavy static loads), and a 20 year manufacturer's written warranty.

C302007 WALL BASE FINISHES

Provide a wall base where noted in the space requirements in Chapter 5, "Room Requirements". Flooring of ceramic, porcelain or quarry tile shall have a coordinating wall base.

Resilient Wall Base: Provide 4”h cove rubber throughout areas as indicated in Part 3 Chapter 5 Room Requirements.

Tile Base: Areas with tiled floor must have a matching 4”high base, unless wall tile is required, or otherwise specified. Tile wall base units must be pre-formed; cut tiles will not be allowed. Areas with tiled floor and no specified wall tile must have coordinating cove transition strips between floor tile and wall surface. Wall base tile sizes and grout lines must align with floor.

C302008 STAIR FINISHES

Stair tread, risers and landings shall be of a resilient finish and match the finish floor design scheme of the facility. Treads shall provide a slip resistant finish that is ADA compliant.

C302010 HARDENERS AND SEALERS

Finish concrete surface smooth enough to meet the minimum requirements of this RFP or the floor finish manufacturer's smoothness requirements, whichever is the most restrictive. Provide 3 coats of the manufacturer's approved sealer for exposed concrete floors that are not required to have an applied floor finish.

C3030 CEILING FINISHES

Provide ceiling finishes as indicated in Part 3 Chapter 5 Room Requirements portion of this RFP.

Paint exposed structural systems in accordance with PTS Section C3040 INTERIOR COATINGS AND SPECIAL FINISHES.

Existing ceilings with plaster finish, either altered or requiring repair, must be plastered smooth (no visible joints or cracks) and painted.

C303001 ACOUSTICAL CEILING TILES AND PANELS

Provide acoustical, sag-resistant, ceiling tiles and panels where acoustical ceiling panels (ACP) are noted in Chapter 5, "Room Requirements".

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 edge. Provide fine fissured panel surface. Select finished surface of ceiling tiles to address acoustical, maintenance, moisture or impact resistance requirements of the room.

Sound diffusers 24" x 24", inset in place of acoustical tile units, unless mentioned otherwise in 5.0 Room Requirements. Provide sustainable panels.

C303002 GYPSUM WALLBOARD CEILING FINISHES

Provide gypsum wallboard ceilings where noted in Chapter 5, "Room Requirements". Type of wallboard will vary dependent on the moisture content and use of the space; refer to ceiling of individual space in Chapter 5, "Room Requirements". Moisture Resistant gypsum wall board shall be used in all wet or humid areas include, but not limited to vestibules, toilet rooms, laundry rooms, locker rooms, and shower areas.

C303003 PLASTER CEILING FINISHES

Provide plaster finish where noted in Chapter 5, "Room Requirements".

Existing ceilings with plaster finish, either altered or requiring repair, shall be plastered smooth (no visible joints or cracks) and painted.

C303005 SUSPENSION SYSTEMS

Provide exposed grid, non-corrosive suspended ceiling systems for acoustical ceiling tile and panels where noted in Chapter 5, "Room Requirements". Suspension systems for acoustical ceiling tile, wallboard or plaster ceilings shall comply with seismic requirements for the project location.

C303090 OTHER CEILING & CEILING FINISHES

Provide elevator ceilings where noted in Chapter 5, "Room Requirements".

C3040 INTERIOR COATINGS AND SPECIAL FINISHES

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

The paint finish will be satin for gypsum partitions, and semi-gloss for metal doors, frames, and

handrails. The paint finish will be cleanable flat on gypsum board ceilings.

All finish coatings must be as indicated in Part 3 Chapter 5 "Room Requirements" portion of this RFP.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

D10 CONVEYING

SYSTEM DESCRIPTION

Conveying System(s) include elevators.

D1010 ELEVATORS AND LIFTS

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

D101002 PASSENGER ELEVATORS

Provide 2 passenger elevator(s). Locate elevator one between Buildings 1 and 2 and elevator 2 between Buildings 2 and 3 on the west end of the barracks.

Provide ADA compliant elevators sized to comply with the International Building Code (IBC) medical stretcher requirements. Passenger elevators that will be used to transport material that exceeds 25% of the capacity of the elevators must be designed with a minimum of ASME A17.1 Class C-3 loading.

In reference section 2.3.2 Resiliency and to comply with ***ASCE 24, Flood Resistant Design and Construction*** make the following accommodations:

- The electrical control panel, machine room, hydraulic pump, and reservoir tank must be above the flood elevation.
- Locate the hydraulic lines, cylinders, and buffer springs to protect from physical damage, or paint/ coat them with galvanic or rust-preventive paint. Any components below the elevation must be constructed of flood resistant materials and be capable of resisting physical damage.
- The elevator must have controls to prevent cab from descending into flood water.

Derive finishes and fixtures from the full range of Manufacturer's selections. Coordinate with Chapter 3, Part 5 Room Requirements 8.3 - Elevator. Coordinate finishes with the interior architectural design and meet the User's needs and functions. Coordinate the design of the elevator machine room with applicable codes and the elevator manufacturer's requirements.

Provide hydraulic elevators for elevator travel distances of 44 feet (13.41 meters) or less. Provide hydraulic elevators 150 feet/minute (45.7 meters/ minute) for hydraulic elevator travel distances greater than 15 feet (4.5 meters).

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

D20 PLUMBING

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

SYSTEM DESCRIPTION

The plumbing system for Building 550 consists of all fixtures, potable cold and hot water piping, recirculation piping, natural gas piping and equipment, piping insulation, water heating equipment, sanitary waste and vent piping systems, and other specialty piping and equipment within 5 feet of the building. Refer to Building Requirements, Space Tabulations Section of the Project Program for building occupancy levels.

GENERAL SYSTEM REQUIREMENTS

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

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

All UFCs and Federal Standards, and codes must be mandatory. In the event of any discrepancy between the referenced UFCs, codes, standards, and the contents of this RFP, the more demanding criteria must govern. All above-grade domestic water, sanitary waste, and vent piping must be installed on the conditioned side of the building envelope.

Materials must comply with applicable Underwriters Laboratory (UL) Inc., American National Standards Institute, Inc. (ANSI), and National Electrical Manufacturer's Association standards or applicable standards of a similar independent testing organization. All materials must be new and must bear the UL label whenever standards have been established and label service is normally and regularly furnished by the agency. All material provided must be listed and labeled suitable for the specified purpose, environment, and application and provided in accordance with manufacturer's recommendations. All insulation must be asbestos free.

Pressed type, extruded type, and grooved type pipe fittings must not be used.

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.

Provide floor-mounted, back outlet, flush valve water closets with automatic flush control in all public restroom spaces. Maximum flush volume not to exceed 1.28 gallons per flush.

Provide floor-mounted, one-piece, back-outlet, dual-function, flush tank water closets in private restroom spaces. Maximum flush volume not to exceed 1.28 gallons per flush.

D201002 URINALS

Refer to Room Requirement Section for the number and type of urinals required.

Provide flush valve urinals with automatic flush control in all public restroom spaces. Maximum flush volume not to exceed 0.5 gallons per flush.

D201003 LAVATORIES

Refer to Room Requirement Section for the number and type of lavatories required.

Provide countertop lavatories with manual faucet in each restroom in the barracks and in the ABA rooms. Provide pop-up drain.

Provide wall mounted lavatories made of vitreous china, with automatic control faucet in public spaces.

D201004 SINKS

Refer to Room Requirement Section for the number and type of sinks required.

Provide mop sink in the housekeeping and janitorial spaces.

Provide laundry sink in the laundry spaces.

D201005 SHOWERS

Refer to Room Requirement Section for the number of showers required.

Provide a solid surface, seamless (except at corners), floor-to-ceiling shower stall with matching shower floor and shower supply fittings in the barracks spaces. Provide raised floor with central drain and horizontal pipe to the plumbing chase.

Provide a solid surface, seamless (except at corners), floor-to-ceiling shower stall with built-up tiled floor and shower supply fittings in the ABA barracks spaces. Provide side angle drain to minimize shower floor height. Remove existing two inch topping slab and build up shower floor to lowest height possible to provide positive drainage. Raise bathroom floor to ¼” higher than resulting shower floor and provide ramp for access from living area.

Provide all fixtures and thermostatic shower valve. Install showerhead at 80” above the floor for regular showers and no higher than 48” for ABA showers.

D201006 DRINKING FOUNTAINS AND COOLERS

Refer to 5.0 Room Requirement Section for the number and location of drinking fountains required.

Provide ABA compliant bi-level anti-microbial stainless-steel electric water coolers. Upper level must

contain integral bottle filling station. Water cooler to have a minimum of 8 GPH laminar flow and chiller capacity. Bottle filling station to have a minimum of 1.1 GPM laminar flow and chiller capacity, LED filter monitor, and be sensor activated.

D2020 DOMESTIC WATER DISTRIBUTION

Perform a flow test to determine system requirements. Preliminary findings indicate a booster pump may be required.

A flow test was performed with the following results:

Date: 10/29/2025
Time: 09:45
Location: Two closest hydrants to B550 along Terrier Ave.
Static pressure: 55 psi
Residual pressure: 45 psi
Flow: 840 gpm

D202001 PIPES AND FITTINGS

Provide Copper tubing and fittings for above ground and buried piping. Note that a portion of buried piping, mostly serving Building #4, may be inaccessible due to the prestressed structural floor panels. Coordinate pipe replacement omissions with contracting officer.

D202002 VALVES & HYDRANTS

Provide isolation valves at supply to each floor and shutoff valves at all fixtures. Locate valves in plumbing corridors where possible and provide access panels where needed in other areas. Provide hose bibbs with vacuum breaker in main mechanical room. Provide wall hydrants with vacuum breakers along the building exterior such that all points along the perimeter can be reached with a 100 foot (30 meter) long hose. Exterior fixtures to have shutoff valves and draining provisions to protect from freezing.

D202003 DOMESTIC WATER EQUIPMENT

Provide backflow preventers of types and at points within domestic water systems as specified by IPC. Locate building backflow preventer inside the mechanical room on service entrance lines where not provided exterior to the building. 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.

A single water meter with AMI connectivity is required inside B550. An AMI connection is not available at this time, however, connectivity is forthcoming.

Provide natural gas fired water heaters with condensate neutralization for heating of domestic water. See preliminary LCCA calculations in Part 6 Attachments, Section U. An in-depth review of LCCE is a requirement for the contractor to investigate. Also, the DOE “Clean Energy for New Federal Buildings and Major Renovations of Federal Buildings” may apply when it becomes active on 05/01/2026.

If a heat pump water heater proves viable, provide an Energy Star Certified, UL Listed unit with a high heating capacity per unit to prevent requiring a large bank of heat pumps. Provide a pre-charged unit with 513A refrigerant, variable speed pump, electronic expansion valve, reversing valve, a remote mountable control panel, adjustable setpoint, modular design, scroll compressor, and designed and approved for either indoor or outdoor use. Provide an indoor tank sized to serve the building while considering the recovery rate of the heat pump water heaters. Refer to the Performance Technical

Specifications section for requirements for other types of water heaters.

Provide master thermostatic mixing valve.

Provide domestic hot water recirculation system with high efficiency recirculation pump and recirculation loop with all associated fixtures, equipment, and appurtenances. Circulate hot water at a minimum temperature of 140°F with maximum pipe lengths as specified in IECC “Maximum allowable pipe length method.” Provide in-line or base mounted circulator for domestic hot water distribution system.

Incoming design water temperature to be 43°F.

Provide domestic water booster system for domestic water distribution system if applicable.

Locate all equipment at a height and position that is readily accessible and serviceable.

D202004 INSULATION & IDENTIFICATION

Provide mineral fiber insulation with vapor barrier on domestic hot water supply and recirculation piping. Provide cellular glass insulation with vapor barrier on domestic cold water supply and grey water piping. Provide identification for piping and equipment in compliance with ASHRAE 90.1.

D202005 SPECIALTIES

Provide washing machine connector box for clothes washers. Provide ice maker connector box for ice machine in Lobby. Provide separate drain system for washing machine drains that leads to an accessible lint interceptor before discharging to sanitary.

D202090 OTHER DOMESTIC WATER SUPPLY

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

D2030 SANITARY WASTE

D203001 WASTE PIPE & FITTINGS

Provide cast iron hubless pipe and fittings with stainless steel clamps in compliance with ASTM A888, CISPI 301, and ASTM B306 for above ground installation.

Provide plastic PVC piping, fittings, and solvent cement for below ground installation. Note that a portion of buried piping may be inaccessible due to the prestressed structural floor panels. Coordinate pipe replacement omissions with contracting officer.

D203002 VENT PIPE & FITTINGS

Provide cast iron hubless pipe and fittings with rubber compression gasket joints or PVC piping with solvent cement fittings.

D203003 FLOOR DRAINS

Provide floor drains per floor in mechanical rooms, housekeeping, laundry rooms, public restrooms,

plumbing chase areas, and as required by 5.0 Room Requirements.

Provide floor sinks to receive condensate from air handling units.

D203004 SANITARY & VENT EQUIPMENT

Provide sump pump in the elevator pit. Provide oil minder with control panel if hydraulic equipment is utilized.

D2040 RAIN WATER DRAINAGE

D204001 PIPE & FITTINGS

Provide Cast iron hubless pipe and fittings above ground. Provide PVC piping, fittings, and solvent cement below ground. Note that a portion of buried piping may be inaccessible due to the prestressed structural floor panels. Coordinate pipe replacement omissions with contracting officer.

D204002 ROOF DRAINS

Provide primary roof drains that are compatible with the roofing system. Existing scuppers will be retained for overflow drainage.

D204004 INSULATION & IDENTIFICATION

Provide the same as domestic water piping.

D204090 OTHER RAIN WATER DRAINAGE SYSTEM

In accordance with the required LCCA, a rainwater reuse system was determined to be not cost effective. See calculations in Part 6 Attachments, Section U.

D2090 OTHER PLUMBING SYSTEMS

D209001 SPECIAL PIPING SYSTEMS

Provide applications and permits, and provide the complete natural gas system from the load side of the utility meter to the heating equipment. Utilize HDPE piping for underground service and Sch 40 black steel for above ground. Contract with the local gas utility provider for installation of piping and appurtenances up to the load side of the meter. Tie the gas meter into the Building Automation System (BAS) and the existing Advanced Metering Infrastructure (AMI) metering system. A Utility/Energy Monitoring and Control System (UMCS/EMCS) may also be present in this portion of the base.

D209003 INTERCEPTORS

Provide lint interceptor for washing machine discharge piping.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

D30 HVAC

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

SYSTEM DESCRIPTION

Provide complete and usable heating, ventilating and air conditioning (HVAC) systems that attains the following objectives: Occupant comfort, Indoor air quality, Acceptable noise levels, Energy efficiency, Reliable operation, and Ease of maintenance. Design and install in accordance with UFC 3-401-01, *Mechanical Engineering* and related UFCs. These UFCs incorporate provisions of the International Code Council's International Mechanical Code (IMC) and ASHRAE design guidance with supplemental requirements. Provide BACnet Direct Digital Control for all HVAC system controls in accordance with UFC 3-410-02 *Direct Digital Control for HVAC and Other Building Control Systems*. Refer to Building Requirements, Space Tabulations Section of the Project Program for building occupancy levels.

Work related to the building mechanical (HVAC) systems includes complete demolition of all existing HVAC systems and equipment serving Building 550. Demolition of the existing equipment includes but is not limited to demolition of natural gas-fired boilers, heating hot water and chilled water pumps, variable-air-volume (VAV) air handlers, fan-powered VAV terminal units, roof mounted exhaust fans, hot water unit heaters, and all equipment controllers. Demolish all hot water and chilled water system piping, all system pipe hangers, and all system appurtenances. Underground chilled water supply and return piping from the district bachelors enlisted quarters (BEQ) chilled water plant must remain for reuse. Demolish all other underground chilled water and hot water distribution piping between the main mechanical room and the three residential buildings. Refer to existing building drawings in Part 6 Attachments and ESR F20 for information related to demolition of mechanical utilities.

Provide HVAC system for Building 550 with 4-pipe fan coil indoor units, chilled water from the district BEQ chilled water plant, natural gas fired boilers, and dedicated outdoor air system (DOAS) with full exhaust-air heat recovery. Provide automatic and manual changeover capability for chillers and boilers. Provide indoor units in each room with temperature control. Deliver outside air at the required conditions from the DOAS to the inlet of the fan coil units. DOAS must be a factory-packaged unit that delivers the required conditioned air over the full range of load when the heat recovery either is or is not operating.

> **BID OPTION:** Provide an air-cooled chiller(s) as described in D303001 in lieu of using the district chilled water plant. Remove chilled water supply and return piping from the district chilled water plant as described in D304006.

Refer to Building Requirements, Space Tabulations Section of the Project Program for building occupancy levels.

Refer to Part 6 Attachments, Attachment V Mechanical Calculations for the completed preliminary HVAC system life cycle cost analysis (LCCA) and preliminary building energy model.

Provide an HVAC system and building envelope LCCA in accordance with UFC 1-200-02. Each LCCA must be further developed in accordance with DOR's Design. The contractor is permitted to suggest alternative systems and assemblies, provided they yield higher estimated percentage energy savings than the ASHRAE 90.1 baseline. Include one alternative utilizing DOAS units, VAV air handlers, and fan powered boxes with reheat coils.

BID OPTION: Consider use of an air-cooled chiller in lieu of the district chilled water plant in accordance with the BID option described in section D303001.

Provide an Energy Model in accordance with UFC 1-200-02 at each submission that is updated to reflect the DOR's design. Demonstrate and document an energy savings of at least 30% when compared to the ASHRAE 90.1 baseline. If no strategies are Life Cycle Cost Effective (LCCE), and do not achieve at least 30% energy savings relative to the ASHRAE 90.1 baseline, select the alternative that provides the highest energy savings that is LCCE relative to the ASHRAE 90.1 baseline.

GENERAL SYSTEM REQUIREMENTS

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

Provide air conditioning and heating for spaces as indicated and for the following design conditions and in accordance with UFC 3-410-01:

Outside Conditions – Comfort Cooling & Heating

Summer (1.0% DB Occurrence)	91	Degrees F dry bulb	Winter (99% Occurrence)	25	Degrees F dry bulb
	76	Degrees F wet bulb		22	Degrees F wet bulb

Outside Conditions – Freeze Protection

Winter (Median of Extreme Lows)	18	Degrees F dry bulb
	16	Degrees F wet bulb

Outside Conditions – Dehumidification

Summer (1.0% Humidity Ratio Occurrence)	83	Degrees F dry bulb	Winter (99% Occurrence)	25	Degrees F dry bulb
	132	Grains / lb		22	Degrees F wet bulb

Inside Conditions – Comfort Cooling & Heating

Summer	78	Degrees F dry bulb	Winter	68	Degrees F
	26	Degrees C dry bulb		20	Degrees C
	50	Percent RH			

Inside Conditions – Telecommunication Equipment Rooms

Summer	72	Degrees F dry bulb	Winter	72	Degrees F

	50	Percent RH		

Inside Conditions – Mechanical, Electrical, and Fire Protection Equipment Rooms

Summer	80	Degrees F dry bulb	Winter	45	Degrees F
	50	Percent RH			

Provide Ventilation rates and systems in accordance with ASHRAE Standard 62.1, *Ventilation for Acceptable Indoor Air Quality*. Complete a dewpoint / latent load analysis and consider increasing ventilation rates to provide sufficient dehumidification and moisture control. Additionally, perform air balance calculations to ensure positive pressurization of all spaces to minimize air infiltration.

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

Zone the HVAC system as follows:

Each dwelling unit must be a separate zone.
Each office must be a separate zone.
Training room must be a separate zone.
Lounge must be a separate zone.
Lobby must be a separate zone.
Each mechanical room must be a separate zone.
Each telecommunication equipment room must be a separate zone.
Each electrical room must be a separate zone.
Each fire protection room must be a separate zone.
Elevator machine room must be a separate zone.

Provide corrosion protection in accordance with UFC 1-200-01 and UFC 3-410-01. Per UFC 1-200-01, Dam Neck Naval Station has an Environmental Severity Classification of C4. Corrosion protection is also required on HVAC equipment within buildings that are subject to the outside weather conditions.

Mechanical, electrical, and fire protection equipment rooms must be provided with heating and cooling as required. Ventilated and heated only systems are not acceptable due to increased corrosion from untreated outside air.

Provide minimum 4-inch thick concrete housekeeping pads and vibration isolators under all floor-mounted equipment.

Provide factory painted finishes that are designed for 3000-hour duration test for outside equipment and for equipment bringing in outside air.

Provide all mechanical equipment HVAC cooling/heating and condenser coils with a manufacturer approved coating system. The heat transfer rating must be as installed.

For administrative and training spaces unoccupied mode, provide the following night setback temperatures:

For winter, 10 degrees F lower than indoor heating design conditions, but no lower than 55

degrees F.

For summer, 5 degrees F higher than indoor cooling design conditions, but no higher than 85 degrees F.

D3010 ENERGY SUPPLY

D301002 GAS SUPPLY SYSTEM

Obtain natural gas pressures from the local natural gas utility provider, Columbia Natural Gas. Provide any applications and permits and provide the complete natural gas system from the load side of the utility meter to the heating equipment. Contract with the local natural gas utility provider for installation of piping and appurtenances up to the load side of the meter. Provide gas meter on the building main and tie meter into the Building Automation System (BAS).

D301005 SOLAR ENERGY SUPPLY SYSTEMS

A preliminary domestic hot water system life cycle cost analysis (LCCA) has been completed and is documented in Part 6 Attachments, Section U. The preliminary study has determined that a solar domestic hot water system is not life cycle cost effective. Perform a final detailed LCCA in accordance with UFC 1-200-02 to determine the feasibility of providing solar domestic hot water. Use the FEMP solar hot water system calculator available at the FEMP website. The study must consider a system designed to furnish a minimum of 30 percent of the annual demand and a system designed to furnish a minimum of 100 percent of the annual demand.

If life cycle cost effective provide a complete solar domestic hot water system including heating panels, roof supports, piping, pumps, hot water storage tanks, heat exchangers and controls. Provide a system designed to furnish a minimum capacity as determined by the LCCA for domestic hot water.

If the solar domestic hot water system is located on the roof, provide a coordinated design of the roof elements in accordance with UFC 3-110-03 Roofing. Organize the roof space necessary to accomplish the functions the roof has to provide, minimize roof penetrations, and plan the roof to facilitate future reroofing of the facility. Select the roof type and detail roof mounted equipment to complement the implementation of the functions that have to take place on the roof and minimize the need for routine maintenance. Accomplish a Pre-Roof Design Conference prior to the design of the roof.

D3020 HEAT GENERATING SYSTEMS

Provide a heating system for this facility consisting of 2 boilers, each providing 65 percent of the load.

D302001 BOILERS

Provide two natural gas fired condensing boilers each sized for 65 percent of the load. Minimum boiler efficiency must be greater than 90% with a maximum 20ppm NOx level. Provide boilers with a minimum turndown ratio of 10 to 1. Condensing boilers must be equipped with the boiler manufacturer’s condensate neutralization system.

Provide boiler controls with BACnet communication protocol.

D302005 EQUIPMENT THERMAL INSULATION

Provide insulation for system equipment, hot water pumps and other associated heating equipment.

D3030 COOLING GENERATING SYSTEMS

D303001 CHILLED WATER SYSTEMS

Provide connection to and extension of the existing central chilled water system for service to the building HVAC equipment. The existing chilled water system provides chilled water at 45 degrees F.

Provide insulation and vapor barrier on all chilled water equipment within B-550.

Provide chilled water system controls with BACnet communication protocol.

> **BID OPTION**: Provide a scroll air-cooled chiller using a variable primary pumping system. Provide chillers with integral electronic compressor speed control for matching dynamic load conditions. Provide a cooling system for this facility consisting of 1 chiller sized for 100 percent of the load. Provide chiller with corrosion protection coatings on all coils, frame, and casing, meeting or exceeding the requirements of a 3000-hour salt spray test in accordance with ASTM B117. Provide chiller with low-ambient capability. Provide shot-type feeder for manual chemical feed for the closed loop system. Provide chiller with integral screens or louvers for compliance with AT/FP requirements. Provide heat tracing for all above-ground equipment and piping that are subject to freezing. Provide complete start-up and operation testing of the chiller equipment. Provide chiller with BACnet communication protocol in accordance with ASHRAE *135 BACnet – A data Communication Protocol for Building Automation and Control Networks.*

D303002 DIRECT EXPANSION SYSTEMS

Provide a dedicated air-cooled direct expansion (DX) ductless split system heat pump unit for each Telecom space in accordance with UFC 3-580-10.

Provide a dedicated air-cooled direct expansion (DX) ductless split system heat pump unit for the elevator equipment rooms.

Provide a dedicated air-cooled direct expansion (DX) ductless split system heat pump unit for the electrical equipment rooms requiring conditioning.

Provide each system with a wall-mounted, adjustable thermostat. Provide a separate room temperature sensor and current sensor for each ductless split system, connected to the DDC system to monitor space temperature and unit status.

D3040 DISTRIBUTION SYSTEMS

D304001 AIR DISTRIBUTION, HEATING & COOLING

Provide insulated, galvanized ductwork constructed, braced, reinforced, installed, supported, and sealed in accordance with the IMC and Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) standards. Provide all ductwork constructed to seal class A. Provide air volume balancing dampers in all branch ducts. Air volume dampers must be accessible. Provide lockable access doors where dampers are located above hard ceilings (i.e. gyp board, etc.).

Provide aluminum grilles and diffusers. Provide filter grilles for return air to 4-pipe fan coil unit except in dwelling units.

Do not route ductwork through electrical rooms, telecommunication equipment rooms, or elevator equipment rooms.

D304003 HOT WATER DISTRIBUTION SYSTEMS

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

For piping exposed to outdoor ambient temperatures, provide heat tracing to ensure freeze protection down to 10 degrees F.

Provide a primary/secondary pumping system to serve the HVAC hot water equipment throughout the facility. Provide two base mounted end suction pumps on the secondary side (building distribution) of primary/secondary systems. Configure pumps as primary/standby. Provide a dedicated circulating pump (primary side) for each boiler.

Configure the hot water distribution system in a reverse return arrangement. Provide insulated steel or copper hot water supply and return piping to serve the HVAC equipment throughout the building.

Provide valves and related hot water system appurtenances. Provide isolation valves for all equipment. Triple-duty valves (combination check valve/balancing valve/isolation valve) are not allowed. Automatic flow control valves are not allowed.

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

Provide a bladder type expansion tank for the hot water piping system.

Provide isolation valves, y-strainers, balancing valves, and control valves at all terminal equipment. Provide air vents at system high points and drain valves at system low points.

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

Provide complete system start-up and operational testing of all hot water systems.

D304006 CHILLED WATER DISTRIBUTION SYSTEMS

For exterior buried chilled water distribution systems, coordinate with Section G30, *Site Civil/Mechanical Utilities*. Connect to the existing district BEQ chilled water system.

Provide a variable speed pumping system to serve the HVAC chilled water equipment throughout the facility. Provide two base mounted end suction pumps configured as primary/standby for distribution to the building.

For piping exposed to outdoor ambient temperatures, provide heat tracing to ensure freeze protection down to 10 degrees F.

Configure the chilled water distribution system in a reverse return arrangement. Provide steel or copper chilled water supply and return piping to serve the HVAC equipment throughout the facility. Insulate piping with cellular glass insulation.

Provide valves and related chilled water system appurtenances. Provide isolation valves for all equipment. Triple duty valves (combination check valve/balancing valve/isolation valve) are not allowed. Automatic flow control valves are not allowed.

Provide air vents at all cooling coils and at system high points. Provide drain valves at system low points.

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

Provide a bladder type expansion tank for the chilled water piping system.

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

BID OPTION: Remove the 4” district chilled water supply and return piping line serving the building back to the 6” district chilled water main. Provide chilled water piping connecting the air-cooled chiller to the chilled water system.

D304007 EXHAUST SYSTEMS

Provide ductwork constructed, braced, reinforced, installed, supported, and sealed in accordance with the IMC and SMACNA standards. Provide seal class A on all exhaust ducts.

Provide ducted exhaust from each dwelling unit bathroom to the DOAS units. Provide ducted exhaust from each restroom space and janitors closet to DOAS units.

Provide ducted exhaust ventilation systems and exhaust fans to serve all ventilated zones of the facility. Capture all bathroom, restroom, and janitors closet exhaust and route it through a total energy recovery device before exiting the building.

Provide dryer exhaust ducted to building exterior. Provide corresponding makeup air for dryer exhaust. Provide accessible cleanouts for all dryer exhaust ducts.

D304008 INDOOR AIR HANDLING UNITS

Provide dedicated outdoor air systems (DOAS) with chilled water cooling coils, hot water heating coils, supply fans, exhaust fans, and enthalpy core total energy recovery heat exchangers. Units must prevent freezing of coils. Provide units with 2” insulated, double-wall construction. Provide with Minimum Efficiency Reporting Value (MERV) 8 filters ahead of the enthalpy core total energy heat exchanger in the exhaust air stream. Provide MERV 13 filters in the outdoor air stream.

Reroute outdoor air intakes to the roof for all DOAS systems to comply with requirements of UFC 4-010-01.

Provide DOAS units with ultraviolet disinfection systems.

D3050 TERMINAL & PACKAGE UNITS

D305002 UNIT HEATERS

Provide hot water unit heaters to serve the heating requirements of equipment rooms, unless full air conditioning is required. Where unit heaters are used in electrical rooms, provide electric unit heaters, unless full air conditioning is required.

D305003 FAN COIL UNITS

Provide 4-pipe concealed, horizontal, ducted type fan coil units and controls to serve the heating and cooling requirements of the facility. Provide 4-pipe concealed, horizontal, ducted type fan coil units with telescoping bottom panel with integral return air grille and filter in all dwelling units. Provide one fan coil unit for each zone and locate above the ceiling. Provide each fan coil unit with a return filter grille to ease maintenance requirements. Provide horizontal fan coil units in the overhead with a means for removal and maintenance of the units through lockable access panels when located above hard ceilings (i.e., gyp board). Provide auxiliary drain pans below concealed fan coil units extending at

least 4-inches beyond FCU, valves and appurtenances to prevent piping leaks and condensate forming on chilled water piping from damaging ceilings.

Provide fan coil units with ½" internal insulation. Provide elastomeric closed-cell foam insulation conforming to ASTM C 534, UL 181 and NFPA 90A. Insulation must have an anti-microbial performance rating of 0 (no observed growth). Polyethylene insulation is not acceptable. Fiberglass insulation exposed to the air stream is not allowed.

D3060 CONTROLS AND INSTRUMENTATION

D306001 HVAC CONTROLS

D306001 1.1 DIRECT DIGITAL CONTROLS (DDC)

Provide a complete Direct Digital Control (DDC) system to comply with UFC 3-410-02 *Direct Digital Control for HVAC and Other Building Control Systems*, UFGS 23 09 00, *Instrumentation and Control for HVAC,* UFGS 23 09 23.02, *BACnet Direct Digital Control for HVAC and Other Building Control Systems,* UFGS 23 09 13, *Instrumentation and Control Devices for HVAC*, and BACnet communication protocol for the facility.

Provide integration of the new Direct Digital Control (DDC) system to the existing NAS Oceana Utility Monitoring and Control System (UMCS) in compliance with the UMCS's Risk Management Framework (RMF) Authorization to Operate (ATO) and UFGS 25 10 10, *Utility Monitoring and Control System (UMCS) Front End and Integration*. NAS Oceana, including the Dam Neck Annex, has an existing Class Justification and Approval (CJ&A) authorizing the use of brand name commercial Facility Related Control Systems (FRCS) programmable building controllers from the following manufacturers: Johnson Control International (Metasys) and Automatic Logic Corporation (WebCTRL). Provide DDC in accordance with this CJ&A. Refer to Attachment R of Part 6 Attachments for additional information.

Provide notebook computer and complete application software with all licenses.

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

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

Provide at least one local control panel in each mechanical equipment room.

Provide all DOAS units and all fan coil units with discharge/supply air temperature sensors.

Provide DOAS units with integral outside air and exhaust air flow monitoring stations.

In the administrative and common areas (non-dwelling unit areas), provide zone temperature sensors with temporary occupancy override feature for zone occupancy during hours outside of normally occupied hours. Activation of temporary occupancy override must place zone and corresponding in the occupied mode of operation.

Provide dwelling units (barracks) with temperature controls complying with FC 4-721-10N.

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

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

D3070 SYSTEMS TESTING AND BALANCING

Provide complete Testing, Adjusting, and Balancing (TAB) of all air and water distribution systems and HVAC equipment and performance verification testing (PVT) of all HVAC controls systems. Provide duct air leakage testing (DALT) on all DOAS unit supply, return, exhaust, and outdoor air intake ductwork regardless of system duct pressure classification. Low pressure ducts connected to fan coil units do not require DALT testing.

Provide complete Testing, Adjusting, and Balancing of the domestic hot water system. Refer to ESR D20 for details applicable to the domestic hot water system.

D307003 HVAC COMMISSIONING

Refer to RFP Part 3 - Project Program, Chapter 2 for Building Commissioning requirements. Mechanical systems to be commissioned include HVAC systems and controls, and domestic hot water systems. Additionally, refer to Part 2, 01 91 00.15 22 Total Building Commissioning for additional requirements.

D3090 OTHER HVAC SYSTEMS AND EQUIPMENT

D309001 GENERAL CONSTRUCTION ITEMS

Provide equipment bracing required for compliance with the applicable Force Protection Criteria inf UFC 4-010-01. Overhead suspended equipment weighing 31 pounds or more must meet the equipment bracing requirements indicated in UFC 4-010-01. Seismic bracing is not required for seismic design category A. Refer to ESR B10 for additional information.

Provide access to all mechanical equipment rooms through the building exterior walls.

D309090 OTHER SPECIAL MECHANICAL SYSTEMS

Provide enthalpy core total energy recovery heat exchangers in each DOAS unit for recovering energy between the outgoing exhaust air and the incoming ventilation air.

-- 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 and mass notification system 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 all required fittings, connections and accessories required for a complete and usable system. Install equipment in accordance with the criteria of PTS section D40 and the manufacturer’s recommendations. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

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

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

Provide training for the active systems consisting of two (2) eight (8)-hour sessions to accommodate all shifts of the base fire department and allow for rescheduling for unforeseen fire department responses.

D4010 FIRE ALARM AND DETECTION SYSTEMS

Provide an integrated fire alarm, and mass notification systems capable of notifying building occupants both inside and around the building at entrances/exits and other outdoor areas (such as courtyards) commonly used by the building occupants. Provide a complete, electrically supervised, addressable intelligent, manual and automatic, annunciated fire alarm and detection system throughout the facility. Provide a voice evacuation type system that also serves as a mass notification system. Provide integrated systems capable of notifying building occupants by means of tones, strobes, textural messaging, prerecorded and live voice announcements. The fire reporting portion of the system must be compatible with the existing base fire reporting system. Provide a complete and useable fire alarm system including manual stations, system smoke detectors, duct smoke detectors, heat detectors, audio/visual alarms, fire alarm radio transmitter, and electrical supervision of all sprinkler system alarm and supervisory devices.

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

Provide surface mounted manual pull stations.

Provide a remote annunciator located at the main entrance lobby.

The fire reporting portion of the system must be compatible with the existing base fire reporting system. The existing base wide fire reporting is Monaco, D21. Provide Monaco transmitter, antenna and associated appurtenances at the facility to transmit required fire alarm signals to the Regional Dispatch Center via base wide Monaco reporting system.

The integrated system must be capable of receiving mass notification messages from the base-wide emergency management system (mass notification system) and rebroadcasting messages over the building speakers. Prerecorded messages must be provided for the fire alarm and carbon monoxide evacuation system but must not be provided for the mass notification system. The existing base wide mass notification system is Federal Signal system. Provide FedSig transceiver, antenna and associated appurtenance for integration with existing base wide mass notification system.

Provide smoke detector with sounder base in each dwelling unit. Addressable notification appliances (speakers) are not permitted throughout the facility.

D4020 FIRE SUPPRESSION WATER SUPPLY AND EQUIPMENT

Base hydraulic calculations on a static pressure of 55 psig (gauge) with 840 gpm available at a residual pressure of 45 psig (gauge) at the junction with the water distribution piping system.

Provide the incoming sprinkler service with a double check backflow preventer to serve the three individual barracks. A separate incoming sprinkler service with a double check backflow preventer must be provided for the one-story administration building.

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

D4040 SPRINKLER SYSTEMS

Provide wet pipe automatic sprinkler protection to provide complete coverage throughout all interior spaces in accordance with NFPA 13 requirements.

For residential spaces the sprinkler rate of application must be 0.1 gpm/ft^2 over the design area that includes the four adjacent sprinklers that produce the greatest hydraulic demand with a hose stream allowance of 250 gpm.

For light hazard areas the sprinkler rate of application must be 0.1 gpm/ft^2, over an area of 1,500 ft^2 with hose stream allowance of 250 gpm. For ordinary hazard areas the sprinkler rate of application must be 0.2 gpm/ft^2, over an area of 2,500 ft^2 with hose stream allowance of 250 gpm.

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

Provide corrosion resistant fire sprinkler in all wet and damp locations, such as dwelling bathrooms, shower/locker rooms, etc.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

D50 ELECTRICAL

SYSTEM DESCRIPTION

This project includes a complete renovation of the MCIS/Mardet Student Housing Building 550 as listed below. Refer to site plans for building locations.

Demolish the existing electrical system serving building B550, which includes replacing building electrical system to comply with current codes, replacing interior lighting, and replacing exterior building lighting. Work includes replacing electrical distribution equipment, electrical distribution feeders, mechanical feeders, branch wiring, light fixtures, communications and security wiring, and all associated infrastructure.

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

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

Provide a minimum of 15 percent empty space and 15 percent spare capacity (ampacity) for all switchboards, panelboards, and load centers.

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

GENERAL SYSTEM REQUIREMENTS

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

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

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

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

SEISMIC BRACING
Bracing of electrical equipment to resist seismic events is not required based on site seismic design criteria and building importance factor.

ELECTRICAL TESTING

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

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

Refer to Part 3 - Ch. 2 Section 2.3.2 Resiliency for additional information regarding elevated equipment pads and safe-guarding from flooding damage.

D5010 ELECTRICAL SERVICE AND DISTRIBUTION

D501001 MAIN TRANSFORMERS

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

D501002 SERVICE ENTRANCE EQUIPMENT

Provide underground service into the facility.

Provide a switchboard as service equipment. Provide each switchboard with digital metering.

D501004 PANELBOARDS

Provide distribution and branch circuit panelboards with bolt on type breakers throughout to serve loads as required by UFC 3-520-01. Secondary panels, when required, shall be supplied through a breaker at the main panel of each derived system; no feed-thru lug type panels are permitted. Series rated circuit breakers are not permitted. Panelboards must be of sufficient ampacity to serve the designed loads plus a minimum of 15 percent additional ampacity to provide for future growth.

Panelboards will be limited to 42-circuit maximum within one enclosure. Provide a dedicated 208/120-volt, three-phase panelboard in the Telecommunications room, to support a minimum of 24 circuit breakers in accordance with UFC 3-580-01. Provide single-pole or double-pole circuit breakers, as required, with ratings as required.

D501005 ENCLOSED CIRCUIT BREAKERS

Provide enclosed circuit breakers for elevator loads.

D501006 MOTOR CONTROL CENTERS

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

D501090 OTHER SERVICE AND DISTRIBUTION

Provide transient voltage surge protective devices (SPD) at the following locations: service entrance and sensitive or critical equipment.

Provide copper busses.

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 circuits and connections in accordance with the UFC and NEC as required.

Illumination and uniformity levels will be in accordance with UFC 3-530-01 and IES recommendations.

Bedroom lighting and switching will be in accordance with FC 4-721-10N - Section 3-14.3.2.

D502001 BRANCH WIRING

Provide insulated conductors in conduit branch wiring.

D502002 LIGHTING EQUIPMENT

Provide a complete lighting system consisting of exit and emergency lighting and area lighting consisting of LED lighting including switches and automatic controls including occupancy sensors, vacancy 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 entrance facility (EF) (Located in the Admin Bldg. with 4-racks for fiber and copper patch panels for terminations and distribution), backbone distribution system:

1. 2-2" conduit each with 24 strand SMF indoor/outdoor rated to Bldg. 2 TR/ Comm in ABA room closet through existing concrete vault to the mechanical chase,
2. 2-2" conduits each with 3-24 strand SMF (2-24 strand SMF indoor/outdoor rated/ floor) via the existing concrete vault and under walkway to the first floor TR in each building 1 and 3),
3. and horizontal distribution system including, but not necessarily limited to, all cabling, pathway systems, grounding, backboards, connector blocks, protectors for all copper service entrance pairs, patch panels, fiber optic distribution panels, terminators for all fiber optic cables, outlet boxes, telephone jacks, data jacks cover plates and trim rings.
4. Provide 4-2" conduit stubbed out to handhole to the south 5’ from the building for a fiber connection for internet.
5. Provide 2-2" conduit from new handhole adjacent to Building 550 EF (to the south) to manhole # 9 (southeast of Bldg. 534, see civil drawings) adjacent to Building 534.
6. Provide 24 SMF indoor/outdoor through each 2” (quantity 2) from Bldg. 550 to handhole adjacent to Bldg. 550 and through new conduit to manhole # 9 and into Bldg. 534 fiber distribution rack/cabinet for internet connection. Provide connection to the internet through fiber patch cord. Alternative: Provide 2-24 strand SMF fiber cabling through existing pathway to Bldg. 534 if there is one.

Telecommunication Outlet (TO) boxes shall be 4-11/16” square x 2-1/8” deep, at each desk in each of the barracks rooms per room data sheets with 2- RJ45 CAT 6A jacks (one blue, one white) in a 4 port plate and 2- CAT 6A cables (confirm pinout configuration with NAVFAC personnel) and 1” conduit to

the mechanical chase. Each conduit shall be bonded to the telecommunications ground system with # 6 AWG CU ground.

Provide a complete telecommunications ground system (ANSI/TIA 607—E) for all 4 buildings with SBB (Secondary Bonding Bar) ground bars in each TR and the PBB in the Administrative. Bldg. EF (Entrance Facility). The PBB (Primary Bonding Bar) shall be bonded to the main electrical service ground bar.

Each bldg. 1 and 3 shall have vertically aligned TRs (per floor) with ¾” x4’ x8’ fire retardant treated plywood (vertically mounted) on all 4 walls of the TR. Each TR shall have 2-4" sleeves between floors which shall be fire stopped. Each TR shall have 2-24"W x 84”H (45 RMU racks with 6” vertical cable managers on each side and with vertical PDUs, The existing mechanical chases in each building will receive all horizontal cable from individual barracks rooms and cables shall be supported by j-hooks or cable tray through the chase and out to the TR for that floor. Each TR shall have 4-4' conduit from the TR to the mechanical chase on each floor for horizontal cables. Each TR shall have cable tray over each rack minimum 12” x 4” ladder type.to convey cables from the 4-4" conduits to the racks. The racks shall have a fiber shelf at the top to receive the fiber cable and patch panels to terminate the CAT 6A cables. The quantities of patch panels shall be N+1 where N = the # of patch panels to terminate the correct # of cables. Patch panels shall be 48 port (2 RMU). There shall be horizontal cable management panels (HCM)(2 RMU) between the 48 patch panels. Leave space for switches supplied by NAVFAC and rack mounted UPS.

Provide Category 6A Unshielded Twisted Pair (UTP) copper cable for horizontal voice and data cables. Fiber shall be SMF with MPO connectors, 24 strand minimum (OS2). Testing of fiber and copper cable shall be according to specifications.

D503002 PUBLIC ADDRESS SYSTEMS

Provide a Public Address system with speakers in all common spaces

D503004 TELEVISION SYSTEMS

Provide a closed circuit television (CCTV) system for training purposes including, but not necessarily limited to, cable supporting structures, including equipment racks, empty conduits with pull strings, junction boxes, outlet boxes, outlet connectors, and cover plates.

Provide CCTV outlets.

The CATV system is existing to remain.

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.

Provide the ESS for this project in accordance with the requirements of UFC 4-021-02, JAFAN 6/9 Manual *Physical Security Standards for Special Access Program Facilities* and consist of an ACS and CCTV system.

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.

Provide an ESS including equipment and supporting infrastructure complete, tested, and operational.

ESS must be compatible with the Installation's central monitoring system and monitored at the Installation central monitoring station.

Provide an ACS utilizing credential devices to monitor and control personnel movement into the protected area. The ACS must log and archive all transactions and alert authorities of unauthorized entry attempts. ACS must be interfaced with the CCTV system to archive unauthorized entry attempts to assist security personnel in the assessment of unauthorized entry attempts.

Locate equipment containing access control software, authorization data, card-encoded data, personnel identification data, or verification data within the facility.

Provide 8 hours of emergency uninterruptable backup power. Backup power may be provided by batteries, uninterruptable power supply, generators, or combination thereof.

D503006 INDUSTRIAL CONTROL SYSTEMS (ICS)

Provide an Industrial Control System (ICS) distribution system, and horizontal distribution system including, but not necessarily limited to, equipment racks, all wiring, pathway systems, grounding, protectors for all copper service entrance pairs, patch panels, fiber optic distribution panels, terminators for all fiber optic cables, outlet boxes, data jacks, and cover plates.

The ICS Equipment Rack must be 84-inches (2100mm) high, double compartment with two doors, separately keyed with vertical locking mechanism.

Provide Category 6 Unshielded Twisted Pair (UTP) copper cable strand, and single mode fiber optic cable for horizontal ICS distribution system data cables.

D5090 OTHER ELECTRICAL SERVICES

D509001 GENERAL CONSTRUCTION ITEMS (ELECTRICAL)

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

Provide firestopping for conduits, cable trays and busways that penetrate fire-rated walls, fire-rated partitions, or fire-rated floors 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.

In finished space, use battery supported emergency drivers in conjunction with normal lighting fixtures for emergency lighting or a central inverter for emergency lighting.

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

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

D509003 GROUNDING SYSTEMS

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

D509004 LIGHTNING PROTECTION

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

Lightning Protection Systems must not void the roof warranty.

D509005 ELECTRIC HEATING

Provide power wiring and connections as required for all electric heating systems and equipment.

D509006 ENERGY MANAGEMENT CONTROL SYSTEM

Provide power wiring and connections as required for all systems and equipment including. Coordinate connection requirements with service entrance energy monitoring equipment.

D509007 PHOTOVOLTAIC ENERGY SYSTEM

The government performed an initial LCCA for a photovoltaic system that satisfies the renewable energy requirement in UFC 1-200-02, 2-3.3 Renewable Energy. The initial results indicate that a photovoltaic energy system is not life cycle cost effective (LCCE) and therefore is not expected to be required. This does not preclude the use of PV in the design for attaining 30% below baseline Energy Optimization required in UFC 1-200-02, 2-3 Optimize Energy Performance.

If a photovoltaic energy system is incorporated into the design as a strategy for Energy Optimization, perform the following:

- Coordinate PV submetering to report independently through the building's metering system which is reporting to the existing base AMI metering system.
- The PV system must have a zero-export function which does not allow power to back feed without a written utility agreement per IEEE 1547.
- Consider only Facility rated systems interconnected with the main electrical service panel of the building. Utility connected systems must not be used.

At each design submittal, provide an updated LCCA for the minimum capacity photovoltaic (PV) energy systems required if LCCE in accordance with UFC 1-200-02, 2-3.3 Renewable Energy. If determined to be LCCE, notify the contracting officer immediately. This DB RFP does not anticipate PV will be LCCE under this simple analysis required by 2-3.3 Renewable Energy.

When PV is used to accomplish the 30% below baseline Energy Optimization required in UFC 1-200-02, 2-3 Optimize Energy Performance, the whole building LCCA (see Chapter 4 of UFC 1-200-02) must reflect that the solution is LCCE. UFC 1-200-02 requires an integrated design approach to any solution.

If a PV energy system is a part of the final design, it must be designed in accordance with UFC 1-200-02 and UFC 3-440-01.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

E10 EQUIPMENT

GENERAL SYSTEMS REQUIREMENTS

E1010 COMMERCIAL EQUIPMENT

E101003 VENDING EQUIPMENT

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

a. Three soft drink machines
b. One snack machine

E1020 INSTITUTIONAL EQUIPMENT

E102009 AUDIOVISUAL EQUIPMENT

Coordinate design requirements with the end user/Command Information Technology (IT) personnel, and provide Audiovisual (AV) equipment. Provide the services of an audiovisual equipment specialist to design and specify the audiovisual equipment.

AV Equipment including electronics potentially connected to data/IT, must be coordinated with design and construction but planned for and funded by the user or Budget Submitting Office sponsoring the user. AV equipment includes, but is not limited to: intercom/sound systems, smartboards, flat screens, projectors, video teleconferencing, Unified Communications, interactive wall systems and Electronic Security System (ESS).

AV equipment will not be funded as part of the Furniture, Fixtures, & Equipment (FF&E) Package.

AV Equipment will be purchased using separate funding. The AV Equipment will be identified as a separate line item, and priced separately from the FF&E. AV Equipment will be funded as an option.

Coordinate design requirements with the end user/Command Information technology (IT) personnel, and provide Audiovisual (AV) equipment. Provide the services of an audiovisual equipment specialist to design and specify the audiovisual equipment.

AV Equipment including electronics potentially connected to data/IT, must be coordinated with design and construction but planned for and funded by the user or Budget Submitting Office sponsoring the user. AV equipment includes, but is not limited to: intercom/sound systems, smartboards, flat screens, projectors, video teleconferencing, interactive wall systems, Digital Signage and ESS. The AV equipment will be funded as part of the FF&E Package.

E1030 VEHICULAR EQUIPMENT (NOT USED)

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. Testing requirements of Government Furnished equipment is the responsibility of the Contractor and must follow the same guidelines as though the Contractor had provided the equipment. Install and test the following Government furnished items: Multifunction devices, and ice makers.

E1090 OTHER EQUIPMENT (NOT USED)

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

E20 FURNISHINGS

SYSTEM DESCRIPTION

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

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

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

The cost of FF&E must be estimated by the IDOR.

Fixed furnishings (items that are fixed to the structure), such as specialty equipment, blinds/shades are part of the construction contract.

The Audiovisual (AV) Equipment will be identified as a separate line item, priced separately from the FF&E and funded as an option. Refer to Part 3 Section E10 of this RFP.

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 Chapter 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 in accordance with specific facility-type Unified Facilities Criteria (UFC) and in conjunction with UFC 03-120-10, *Interior Design*.

Provide the services of an Interior Designer with a minimum of one of the following credentials: National Council for Interior Design Qualification (NCIDQ) certification, or state and/or jurisdiction Interior Design Certification, Registration, or License. This Interior Designer must prepare both the Strutural Interior Design (SID) and the FF&E Package and participate in all design charrettes and review meetings to develop the building design and floor plan. When Audiovisual (AV), shop or specialty equipment is required in the project, obtain the services of equipment specialists to specify the AV, shop, or specialty equipment. The Contractor's Interior Designer and any Specialists must not have any affiliation with the products specified. The NAVFAC Interior Designer reserves the right to approve/disapprove the qualifications of the Contractor's Interior Designer.

Closley coordinate all fixed and movable furnishings selections with Parts 3 and 4 Sections C10, Interior Construction, and C30 and E10 of this RFP. Fully integrate the FF&E package with the building systems and finishes.

The Contractor's Interior Designer will be responsible for designing and providing specifications for procurement of all FF&E, to include delivery and installation, for the facilities built under this contract

as directed by the NAVFAC Interior Designer. Base the FF&E specifications on General Services Administration (GSA) schedules, and other Federal contracts and complying with priorities found in Federal Acquisitions Regulation (FAR) Part 8.404.

Fully integrate the FF&E package into the design and construction schedule for the building.

Consider furnishings relative to Part 2 UFGS Section 01 33 29, *Sustainability Requirements and Reporting*and UFC 1-200-02, *High Performance and Sustainable Building Requirements*.

INTERIOR DESIGN SUBMITTAL AND MEETING REQUIREMENTS STRUCTURAL INTERIOR DESIGN (SID)

The SID submittal process must begin following the award of the RFP. The SID submittal includes Interior Design programming documents, 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 Section 01 33 10.05 20, *Design Submittal Procedures*.

Provide the following SID meetings and submittals;

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

b. Design Development (35%-50%) Submittal: The Contractor's Interior Designer must provide a conceptual Finish Schedule, proposing finish materials to be used in all spaces. 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 Prefinal (100%) Submittal, the Contractor's Interior Designer must meet with the NAVFAC Interior Designer for an "over-the-shoulder" review meeting to present a minimum of (2) options for the interior building finishes/colors/materials. Finishes must display manufacturer's label/specifications and be presented in a "loose" format for preliminary approval prior to the presentation with the Activity. The over-the-shoulder review meeting is to be held at NAVFAC.

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

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

STRUCTURAL INTERIOR DESIGN (SID) CONSTRUCTION SUBMITTALS

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

FIXTURES, FURNISHINGS AND EQUIPMENT (FF&E)

The FF&E process must begin approximately with the 50% design submittal. The submittals 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 Section 01 33 10.05 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 must demonstrate interaction thoroughly with the Activity requirements and complete coordination with the facility design and the SID. Three (3) submittals will be required; (1) each for the NAVFAC Project Manager, FEAD/ROICC, and the Activity.

For all projects, including fast track projects, the Contractor is responsible for sufficiently scheduling all SID/FF&E submittals early enough to obtain the required government approvals, and meeting all ordering and installation lead times to complete the project by the contract completion date.

Provide FF&E meetings and submittals in accordance with NAVFAC Interior Design Procedures: Furniture, Fixtures & Equipment (FFE).

FF&E CONSTRUCTION SUBMITTALS

Submit any revisions or deviations caused by discontinued items to the Contracting Officer for approval by the NAVFAC Interior Designer.

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.

E201002 WINDOW TREATMENTS

Provide all windows and other glazed openings to the exterior of the building with manually 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 must be included in the FF&E package, as required.

E2020 MOVABLE FURNISHINGS

The design of the FF&E package is funded as part of the construction contract base bid. 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 3-120-10, *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 and the Contractor's Interior Designer is responsible for incorporating these into the FF&E package.

The FF&E Package must include shipping, freight, handling, and professional installation, project management, HAR, applicable sales tax. Perform a Best Value Determination on a minimum of three manufacturers for orders exceeding a total procurement of $3000 from an individual manufacturer. Provide documentation to the Government with the final FF&E package. Specific Documentation is indicated in Part 4 of the RFP. The BVD Statement must be completed and signed by the Contractor's Interior Designer. A sample BVD form and instructions will be provided during the FF&E Procurement Requirements Meeting.

The Contractor, as a planned modification, will 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) must not exceed 5% of the total cost of the FF&E, shipping, freight, handling, and installation. 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. 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.

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

Provide ergonomic task seating, lounge, reception and guest seating, storage and filing, tables, as required.

E202004 RUGS & ACCESSORIES

Provide area soft window treatments (drapery and hardware) and other decorative items as required.

E202090 OTHER MOVABLE FURNISHINGS

Provide waste receptacles, recycling containers, fire extinguishers, clocks, literature racks, stacking washers, washers, stacking dryers, dryers, microwaves, refrigerators, and other appliances as required.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

F20 SELECTIVE BUILDING DEMOLITION

GENERAL SYSTEMS REQUIREMENTS

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

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

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

F2010 BUILDING ELEMENTS DEMOLITION

This project includes the demolition of the following: existing elevator, elevator shaft, elevator mechanical room, aluminum and glass storefront at elevator on each floor, removal of portions of the front entry wall of sleeping rooms including door, frame, window, brick veneer and supporting wall, additional brick and cmu at same entry wall (to accommodate new design for entry), additional openings in exterior brick/cmu wall locations shown for new window(s), and doors. Demolition of aluminum and glass windows, and storefront in the Administration building and all existing exterior doors and frames.

F2010 1.1 GENERAL DEMOLITION

F2010 1.2 UTILITIES

Demolish the existing sanitary sewer utilities. Coordinate utility demolition in accordance with Section 01 14 00 Work Restrictions and this RFP.

F2010 1.3 DUST CONTROL

Prevent the spread of dust and debris and avoid the creation of a nuisance or hazard in the surrounding area.

F2010 1.4 TRAFFIC CONTROL

Provide traffic control in accordance with Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS.

F2010 1.5 WEATHER PROTECTION

Provide traffic control in accordance with Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS.

Maintain the existing portion of the building to be renovated to be weather tight during construction.

F2010 1.6 BURNING

Burning will not be permitted.

F201002 EXTERIOR CLOSURE

Exterior enclosure will remain. The building is a concrete masonry (CMU) construction with a brick veneer. The walls are load bearing and the floor/deck structure is a precast concrete plank system. The walkways are all open-air with precast concrete railings and steel columns all components to remain.

F201003 ROOFING

The roofing will be replaced on all structures. The existing roofing material is built-up roofing over rigid insulation. There is a 2-inch concrete topping over 6-inch prestress/structural plank which will remain.

F201004 INTERIOR CONSTRUCTION & FINISHES

The walls between the sleeping units and support areas are CMU bearing walls and will remain in place with an existing skim coat finish. The interior drywall partitions in the sleeping rooms are around the shower/toilet areas and will be removed and replaced. Flooring and ceiling materials in the restroom/toilet/shower areas will be removed along with all plumbing fixtures and millwork. Lighting and fixtures will be removed and replaced.

F201005 CONVEYING SYSTEMS

The existing brick enclosed elevator, elevator shaft and elevator mechanical room will be completely demolished.

F201006 MECHANICAL SYSTEMS

All existing mechanical systems are beyond their useful life and must be demolished. The existing mechanical systems consist of the following:

Two natural gas fired boilers producing heating hot water which is distributed to variable air volume (VAV) central air handling units, hot water unit heaters, and fan-powered terminal unit with reheat coils, by two base mounted horizontal end suction pumps. Chilled water is generated at the district chilled water plant and delivered to the building through underground piping. Chilled water is then distributed throughout the building to the VAV air handlers by two base mounted horizontal end suction pumps. Roof mounted exhaust fans provide dwelling unit bathroom exhaust and mechanical room ventilation. The existing BACnet DDC system must be demolished.

F201007 ELECTRICAL SYSTEMS

All electrical infrastructure in the existing buildings must be demolished. All existing electrical systems are beyond their useful life and must be demolished. The existing electrical systems consist of the following:

The electrical system serving building B550 includes a 500kVA unit substation with a 2000A switchboard, interior panelboards, receptacles, mechanical equipment connections and feeders,

disconnect switches, branch wiring, communications and security wiring, interior lighting, exterior building mounted lighting and associated appurtenances.

F201008 EQUIPMENT & FURNISHINGS

Existing toilet accessories will be removed and replaced with new. FF&E will be removed and replaced with new.

F201090 OTHER NON-HAZARDOUS SELECTIVE BUILDING DEMOLITION

All sleeping units will be fully renovated. Remove and dispose of plumbing fixtures and interior finishes as identified in the this RFP and for a complete renovation.

F2020 HAZARDOUS COMPONENT ABATEMENT

A Hazardous Materials Survey was completed and is provided in Part 6 of this RFP. Provide design documents meeting UFC 3-81001N. Abatement/removal and disposal of all hazardous materials must be completed in accordance with all local, state, and federal regulations. See the attached Hazardous Materials Survey Report for quantities and locations of identified hazardous materials.

F2020 1.1 PRIVATE QUALIFIED PERSON (PQP)

The General Contractor is required to hire, as a first tier subcontractor, a PQP to ensure compliance with the approved work plans and perform independent inspections, testing and verification of the hazardous components work including: asbestos, lead containing paint, cadmium containing paint, chromium containing paint, mercury containing equipment, LLR components, PCBs, animal droppings, molds and spores, and contaminated soil and groundwater.

F2020 1.3 ASBESTOS

Perform asbestos work in accordance with the specifications and plans provided in Parts 5 and 6. All asbestos-containing materials must be removed prior to disturbance from demolition / renovation activities. ACM shall be removed prior to disturbance by a trained, qualified, and appropriately licensed asbestos abatement contractor. Perform ACM abatement in accordance with the specifications and plans provided in Parts 5 and 6.

F2020 1.4 LEAD BASED PAINT IN TARGET HOUSING AND CHILD OCCUPIED FACILITIES

Lead-based paint above the regulatory limit was not identified in the project area. Lead-containing paints were identified below the regulatory limit.

F2020 1.5 PAINT IN OCCUPIED FACILITIES - LEAD, CADMIUM, CHROMIUM, AND OTHER HAZARDOUS METALS

Lead, cadmium, and chromium-containing paints were identified on building components within the project area. Perform paint work in accordance with the specifications and plans provided in Parts 5 and 6.

F2020 1.6 POLYCHLORINATED BIPHENYLS (PCB)

Perform PCB work in accordance with the specifications and plans provided in Parts 5 and 6. The PCB abatement plan is subject to review and approval by the U.S. EPA. The PCB abatement plan must be submitted to the installation for review at least 45 days prior to commencement of work to allow sufficient review time by the installation and EPA.

F2020 1.7 LOW LEVEL RADIOACTIVE (LLR) COMPONENTS

Perform Low Level Radioactive (LLR) work in accordance with the specifications and plans provided in Parts 5 and 6.

F2020 1.10 MOLDS AND SPORES

Perform mold removal work in accordance with the specifications and plans provided in Parts 5 and 6.

F2020 1.11 WASTE CHARACTERIZATION

Perform disposal in accordance with this RFP and the specifications and plans provided in Parts 5 and 6.

F202002 EXTERIOR CLOSURE

Refer to the HazMat Report in Part 6 of this DB RFP Submission.

F202003 ROOFING

Refer to the HazMat Report in Part 6 of this DB RFP Submission.

F202004 INTERIOR CONSTRUCTION & FINISHES

Refer to the HazMat Report in Part 6 of this DB RFP Submission.

F202005 CONVEYING SYSTEMS

Refer to the HazMat Report in Part 6 of this DB RFP Submission.

F202006 MECHANICAL SYSTEMS

Refer to the HazMat Report in Part 6 of this DB RFP Submission.

F202007 ELECTRICAL SYSTEMS

Refer to the HazMat Report in Part 6 of this DB RFP Submission.

F202090 OTHER HAZARDOUS SELECTIVE BUILDING DEMOLITION

Refer to the HazMat Report in Part 6 of this DB RFP Submission.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

G10 SITE PREPARATION

SYSTEM DESCRIPTION

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

GENERAL SYSTEM REQUIREMENTS

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

A topographic survey of the existing site has been performed. A 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. Prior to starting work, physically verify the location of all existing utilities and obtain additional survey data required to provide a quality final design. Perform a topographic survey in accordance with FC 1-300-09N, *Navy and Marine Corps Design Procedures*. Include the topographic survey in all design submittals. The existence, size, and location of the utilities are not guaranteed by the surveys provided. 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.

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

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

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

Jurisdictional tidal and non-tidal wetlands have not been identified on the project site. Coordinate and obtain the Contracting Officer's approval for proposed haul route(s), work site access point(s), employee parking location(s) and material laydown and storage area(s).

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

GOVERNMENT PROVIDED GEOTECHNICAL INFORMATION

Subsurface soil information, including a geotechnical report from projects immediately adjacent to the project site are included in Part 6.

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

RFP. The minimum requirements for the subsurface investigation and report are as required by FC 1-300-09N with associated references.

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

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

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

GEOTECHNICAL SITE EARTHWORK CONSTRUCTION REQUIREMENTS

Site preparation shall be in accordance with the prescriptive RFP requirements and industry standards, unless otherwise noted.

The Contractor's Geotechnical Engineer shall prepare excavation, sheeting, shoring, and dewatering plans as applicable for earthwork associated with site and foundation construction and underground utility line/structure installation. The plans shall be signed and stamped by the Contractor's Geotechnical Engineer. Qualified personnel under the supervision of the Contractor's Geotechnical Engineer shall provide inspection of earthwork construction, excavations and soil/groundwater conditions throughout construction. These inspections shall include but not be limited to observation of proof rolling of the pavement and slab subgrades; observation of utility trench and utility structure subgrades and bedding material placement; observation of backfilling and compaction operations for utility trench and foundation excavations; observation of slab fill placement and compaction. 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 signed and stamped plans and a written report 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.

G1010 SITE CLEARING

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

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

G101001 CLEARING

The project site does not have saleable timber.

Burning will not be permitted.

G101002 TREE REMOVAL

Preserve trees indicated to remain on the drawings in Part 6.

G101003 STUMP REMOVAL

Remove all stumps under building foundations, roads, parking areas, hard stands, and storage areas as required for project construction.

G101006 DEBRIS DISPOSAL

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

G1020 SITE DEMOLITION & RELOCATIONS

The items to be reused or relocated include dumpsters, and topsoil.

G102001 BUILDING MASS DEMOLITION

Demolish the existing gazebos. Refer to Section F2020, "Hazardous Component Abatement" for requirements regarding removal of hazardous materials and components.

G102002 ABOVEGROUND SITE DEMOLITION

Preserve the following aboveground site elements: all elements not identified to be demolished or replaced.

G102002 1.1 ABOVEGROUND STORAGE TANKS

The project site does not require aboveground storage tank work.

G102003 UNDERGROUND SITE DEMOLITION

Preserve the following underground site elements: all existing utilities required for proposed project.

Remove or relocate existing utilities within 10 feet (3.0 m) of any new facilities or building additions. Existing utilities include but are not limited to piping, structures and conduits. Remove all

appurtenances associated with the utility to be removed so there is no presence of the utility at ground surface.

Remove abandoned sanitary sewer and appurtenances as required. Break up bases to permit drainage.

Remove all appurtenances associated with the utility to be removed so there is no presence of the utility at ground surface.

Abandon utility systems in a manner that conforms to applicable codes and regulations. When piping is abandoned in place, provide a minimum 24 inch (600 mm) plug length. Remove existing utility structures to 3 feet (900 mm) below existing or new adjacent grade, whichever is greater. Break up bases to permit drainage. Backfill excavation with clean fill.

Fill piping under pavements with flowable fill.

G102003 1.1 UNDERGROUND STORAGE TANKS

The project site does not require underground storage tank removal.

G102007 SITE CLEANUP

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

G1030 SITE EARTHWORK

The Designer of Record is required to use UFGS Section 31 00 00 – Earthwork in Part 5 of this RFP, for the project specification, and submit the edited specification section as part of the design submittal for the project.

G103001 GRADING

New grading must follow the existing drainage patterns. Due to site constraints, surface flow must be used to convey runoff to surface conveyances (i.e. swales) to inlets.

The additional storm-drain inlets must be installed in each of the two courtyards to eliminate surface ponding. These inlets drain to the existing storm-drainage systems. Refer to the Part 6 Concepual Site Layout Plan for locations. Grade the courtyards to the closest inlet with a slope of not less than 3 percent and not more than 5 percent.

G103002 COMMON EXCAVATION

Use equipment of commensurate size to accomplish the required work. Over-excavation of areas to obtain additional satisfactory material for the Contractor’s use is not permitted.

G103003 ROCK EXCAVATION

Hard materials and rock will not be encountered during the excavations.

Blasting is not be permitted.

G103004 FILL & BORROW

Common fill in the quantities required is not available at the project site on Government property.

Backfill and fill material in the quantities required is not available at the project site on Government property.

Select fill in the quantities required is not available at the project site on Government property.

Topsoil in the quantities required is not available at the project site on Government property.

G103004 1.1 REQUIREMENTS FOR OFF SITE SOIL

For each borrow site, provide borrow site testing in accordance with Part 2 Section 01 57 19 Temporary Environmental Controls. Do not bring material onsite until tests results have been received and approved by the Contracting Officer.

G103005 COMPACTION

Provide proper compaction equipment to meet compaction requirements based on a standard Proctor. Refer to UFGS 31 00 00 – Earthwork in Part 5 of this RFP.

G103006 SOIL STABILIZATION

The following methods of soil stabilization will not be allowed: pressure grouting.

G103007 SLOPE STABILIZATION

Slope stabilization must be provided through appropriate grading and site design. The design must either achieve a minimum factor of safety of 1.5 against both lateral sliding and overturning (as addressed in IBC Chapter 18) or create a slope that does not exceed the maximum slope permitted by local code requirements.

G103008 SOIL TREATMENT

Chemically treat the entire foundation of each building for termites in accordance with Section 31 31 16.13 Chemical Termite Control included in Part 5 of this RFP.

G103010 TEMPORARY DEWATERING

Provide temporary dewatering. See Part 2, Section 01 57 19, Temporary Environmental Controls, for dewatering treatment requirements.

G103011 TEMPORARY EROSION & SEDIMENT CONTROL

Obtain Erosion and Sediment Control permit required for the proposed work from the Virginia Department of Environment Quality (VDEQ) Submit permit application to the Contracting Officer for approval prior to submitting to the VDEQ.

Construct temporary measures to reduce on-site erosion and off-site runoff and sedimentation as required for project construction and State requirements.

For temporary measures for work adjacent to the wetlands provide E&S controls to include a super silt fence (reinforced with chain link fencing) to be installed along the wetland boundary.

Provide signage during project construction, to reflect the sensitive nature of the adjacent wetland areas. For example: PROTECTED WETLANDS/DO NOT DISTURB.

Inspections of the perimeter controls are to be conducted daily and repair/correct any deficiencies immediately.

G1040 HAZARDOUS WASTE REMEDIATION

The project site does not require hazardous waste remediation.

G1040 1.1 SUBSURFACE SOIL AND GROUNDWATER

Environmental information including environmental analytical data report is included in Part 6, Attachment P.

G103090 OTHER SITE EARTHWORK

G103090 1.1 STOCKPILED SOILS

Store and test stockpiled soils in accordance with Part 2 Section 01 57 19 Temporary Environmental Controls.

G103090 1.2 CLEAN FILL

Backfill soils that are determined to be clean fill via testing in accordance with the requirements listed in Section 01 57 19 Temporary Environmental Controls and Section 31 00 00 – Earthwork in Part 2 and Part 5 of this RFP.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

G20 SITE IMPROVEMENTS

SYSTEM DESCRIPTION

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

The site improvements consist of pavements and pavement related features, landscaping and other exterior site development work related to this project. Provide a pavement design by a licensed Professional Engineer familiar with conditions local to the project site. Site design, including but not limited to re-design of the ABA parking area and the front drop off / fire access lane will include coordination with the Civil Engineer and the Landscape Architect.

GENERAL SYSTEMS REQUIREMENTS

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

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

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

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

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

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

G201001 BASES & SUBBASES

Refer to the SHS for materials allowed for base or subbase courses.

G201002 CURBS & GUTTERS

Provide curb and gutter to tie into adjacent facilities and match existing cross section and finish.

G201003 PAVED SURFACES

Provide Portland cement concrete with a minimum design flexural strength of 650 psi (4.48 MPa) in not more than 28 days.

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

G201004 MARKING & SIGNAGE

Provide pavement markings (including crosswalks) and signage according to UFC 3-201-01 Civil Engineering, the Manual on Uniform Traffic Control Devices (MUTCD), and the Naval Station Norfolk (NSN) Installation Appearance Plan.

G201005 GUARDRAILS & BARRIERS

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

G201006 RESURFACING

Provide removal and replacement of existing pavement where shown in Part 6 by bituminous surface treatment, match depth. Refer to the SHS for materials allowed for b bituminous surface treatmen courses.

G201090 OTHER ROADWAYS

G2020 PARKING LOTS

Remove existing pavement markings conflicting with the proposed parking striping layout as shown in Part 6. Provide handicapped parking, including signage, detectable warning surfaces, pavement markings in accordance with UFC 1-200-01 , *DoD Building Code (General Building Requirements) and shown on Part 6.*

G202001 BASES & SUBBASES

Refer to the VDOT Road and Bridge Specifications for materials allowed for base or subbase courses. Crushed concrete meeting specified gradation for aggregate base or subbase courses may not be used.

G202002 CURBS & GUTTERS

Provide curb and gutter to tie into adjacent facilities and matching existing cross section and profile as existing.

G202003 PAVED SURFACES

Provide Portland cement concrete with a minimum design flexural strength of 650 psi (4.48 MPa) in not more than 28 days.

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

G202004 MARKING & SIGNAGE

Provide permanent and temporary markings (pavement, curb and object), signage (regulatory, warning, ABA parking and guidance) and other traffic control devices as required to facilitate proper

utilization of the parking areas and crosswalks.

G202005 GUARDRAILS & BARRIERS

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

G2030 PEDESTRIAN PAVING

G203001 BASES & SUBBASES

Provide granular aggregate base to a minimum depth of 4-inches compacted to 95% maximum dry density modified proctor (ASTM D1557).

G203003 PAVED SURFACES

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

Provide Enhanced Pedestrian paving of integral colored PCC sidewalk with brick stamped pattern surface in areas identified on plans. Concrete colorant to be mineral-oxide pigment; color stable, nonfading, and resistant to lime and other alkalis.

G203006 OTHER WALKS, STEPS & TERRACES

Provide poured in place impact attenuation surfacing for the surfacing surround the exercise equipment. Depth of surfacing shall be per manufacturers' recommendations for use zone(s) of exercise equipment being provided. Provide positive drainage and include underdrainage.

G2040 SITE DEVELOPMENT

G204001 FENCING & GATES

Provide gates for dumpster enclosure with self-closing mechanism, that screen the contents from public sight and will withstand the abuse of pulling the dumpsters in and out of the enclosure.

G204003 EXTERIOR FURNISHINGS

Site furnishings are required to conform to the Installation Appearance Plan (IAP). Provide prefabricated standing seam metal picnic shelters, picnic tables, trash receptacles, benches, stainless steel charcoal grills, recycling receptacles, and hot ash receptacles as indicated on the drawings in Part 6. Provide prefabricated standing seam metal shelter, benches, trash and ash receptacle at the designated smoking area. Provide exercise equipment as indicated on the drawings in Part 6. All site furnishing to be exterior rated powder coated steel, color to be per IAP recommendations and as approved by COR.

Provide paved picnic areas as indicated on the drawings in Part 6. Design picnic areas to accommodate 5% of the resident population (Expected up to 18 people).

G204005 SIGNAGE

Provide signage in accordance with the Activity's Installation Appearance Plan (IAP).

G204090 OTHER SITE IMPROVEMENTS

Provide dumpster pad and enclosure conforming to the Activity's Installation Appearance Plan (IAP). The enclosure must accommodate three refuse containers.

G2050 LANDSCAPING

Provide complete landscaping consisting of lawn, groundcover, trees, shrubs, perennials, ornamental grasses, organic mulches, and inorganic mulches to provide a quality, cost-effective, functional and visually appealing landscape program that will enhance the development, while complying with anti-terrorism, force protection and physical security requirements. Design the landscape to reinforce the facility entry and complement existing landscapes in the vicinity. Provide a 2' wide (0.6 m) concrete maintenance strip around the building.

Guarantee landscaping for a period of one year. Provide a one year Establishment and Maintenance period. Landscaping Guarantee and Establishment and Maintenance periods must commence on the date that the inspection by the Contracting Officer shows that all landscaping under this contract has been satisfactorily installed.

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

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

G205001 FINE GRADING AND SOIL PREPARATION

Provide 4" minimum of topsoil for lawn areas and fine grade.

G205002 EROSION CONTROL MEASURES

Prevent erosion from occurring by providing erosion control measures as required by city, state and federal requirements. See ESR G30 for additional requirements.

G205003 TOPSOIL AND PLANTING BEDS

Provide a planting soil mixture composed of 50 percent native soil blended with 50 percent topsoil around root balls of shrubs, trees, groundcovers, perennials, and ornamental grasses that is at a minimum, twice as wide and equally as deep as the plant's root balls. Set tops of plant rootballs 2 inches (51 mm) above adjacent grades.

G205004 SEEDING SPRIGGING AND SODDING

Seed or sod areas indicated to be turfed in Part 6. Restore existing turf areas disturbed by Contractor operations that are to remain as turf areas. Restore by means of seeding and provide same guarantee and maintenance as for new landscape areas. Turfgrass species must match existing adjacent turf areas.

G205005 PLANTINGS

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

Provide small trees, shrubs, and ground cover plantings at building main entrances to accentuate the entrances.

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

Provide 3 to 5 inch (76 mm to 127 mm) diameter river stone mulch over weed control fabric] at planting beds adjacent to buildings.

Provide 3 inches (76 mm) of shredded hardwood mulch over weed control fabric at planting beds.

Encompass planting beds not used for bioretention filters with steel edging.

G205090 OTHER LANDSCAPING

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

G30 SITE CIVIL/MECHANICAL UTILITIES

SYSTEM DESCRIPTION

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

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

GENERAL SYSTEM REQUIREMENTS

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

Provide each system complete and ready for operation.

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

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

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

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

Coordinate with the local utility providers and pay fees or charges required to connect to their utility.

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

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

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

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

Provide site civil/mechanical utility systems and components that support project sustainability goals

of Part 2 UFGS Section 01 33 29, *Sustainability Requirements and Reporting*.

Verify the condition of the storm-sewer piping and connections to the storm-sewer system by TV inspection. Complete a visual inspection of all existing inlets and outfalls.

Leakage test is not required.

Perform post-installation TV inspection of new storm-sewer system, if system (s) is replaced.

G3010 WATER SUPPLY

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

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

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

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

G301007 PUMPING STATIONS

A package booster pump station is not required.

G3020 SANITARY SEWER

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

Replace all exterior sanitary sewer piping from the exterior of the buildings to the manhole identified in the drawings in Chapter 6. Match existing pipe sizes. Provide cleanouts in accordance with the utility provider's requirements, and UFC 3-240-01 *Wastewater Collection*; whichever is more stringent.

G302001 SANITARY SEWER PIPING

Provide exterior corrosion protection on metallic pipelines.

G302003 LIFT STATIONS AND PUMPING STATIONS

A wastewater pump station is not required.

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 and operated by the Federal Government. Provide the existing and proposed storm sewer system and connections to the existing storm sewer system in

accordance with [the utility provider's requirements,] UFC 3-201-01 *Civil Engineering*; UFC 3-210-10 *Low Impact Development* and *FC 1-300-09N Navy and Marine Corps Design Procedures*, state stormwater management laws and regulations, local stormwater management laws and regulations and project sustainability goals; whichever is more stringent.

Provide connection to the existing storm sewer collection system at the point indicated on the drawings in another part of this RFP. 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 are not allowed: PVC, ductile iron, corrugated steel, corrugated aluminum, polyethylene (PE), and polypropylene (PP).

G303003 LIFT STATIONS

Stormwater pump stations are not allowed.

G303006 EROSION & SEDIMENT CONTROL MEASURES

Obtain Erosion and Sediment Control (ESC) permit from Virginia Department of Environmental Quality (VDEQ). Submit ESC permit application to the Contracting Officer for approval prior to submitting to VDEQ. Refer to Part 6 attachments for ESC submission guidelines and requirements.

G303007 STORM WATER MANAGEMENT

It is anticipated that this project will not exceed the land disturbance threshold of 1.0 acre requiring stormwater management.

G3040 HEATING DISTRIBUTION

Use the following design parameters for buried piping systems:

1. Minimum depth of burial must be 36 inches from the center of pipe to final ground surface.
2. Earth thermal conductivity of 2.16 W/m-k.
3. Earth temperature of 50°F.

G304003 UNDERGROUND HOT WATER SYSTEMS

Provide direct buried, factory pre-fabricated, pre-insulated piping systems with steel carrier pipe. Provide drainable/dryable/testable (DDT) type system.

G304090 OTHER HEATING DISTRIBUTION

Provide a sacrificial anode cathodic protection system for the underground metallic piping systems.

G3050 COOLING DISTRIBUTION

G305002 UNDERGROUND COOLING SYSTEMS

Provide direct buried, factory pre-fabricated, pre-insulated piping systems. Piping systems must

consist of a steel or copper carrier pipe with polyurethane insulation and a PVC jacket.

G305090 OTHER COOLING DISTRIBUTION

Provide a sacrificial anode cathodic protection system for the underground metallic piping systems.

G3060 FUEL DISTRIBUTION

G306006 GAS DISTRIBUTION PIPING NATURAL GAS

Provide steel or polyethylene (PE) natural gas piping system. See ESR D30 for gas meter requirements associated with direct digital control (DDC) system and existing AMI meter.

G306090 OTHER FUEL DISTRIBUTION

Provide warning and identification tape for underground utilities.

-- End of Section --

6. ENGINEERING SYSTEMS REQUIREMENTS

G40 SITE ELECTRICAL UTILITIES

SYSTEM DESCRIPTION

Demolish the existing 4.16kV ductbank from existing Pad Mounted Switch (SW-2) to B550 Indoor Electrical Unit substation system and provide a 4.16kV primary ductbank, secondary ductbank and pad mounted transformer. Additionally, the Design-Build contractor will replace the existing SF6 Pad Mounted 3-way Switch (SW-2) with a SF6 Pad Mounted 4-way Switch. Coordinate utility outages with UEM prior to disconnection and replacement.

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

GENERAL SYSTEM REQUIREMENTS

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

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

Refer to Part 3 - Ch. 2 Section 2.3.2 Resiliency for additional information regarding elevated equipment pads and safe-guarding from flooding damage.

G4010 ELECTRICAL DISTRIBUTION

Connect to the existing 4.16kV, 208Y/120 volt, three phase, three wire, 60 Hertz electrical power system. The connection point must be underground at the 4-way Pad Mounted SF6 Switch and extended to the project site underground in ductbank to a Pad Mounted Transformer.

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

G401002 TRANSFORMERS

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

Provide the following features:

1. Dead-Front Design with ANSI specific front plate spacing
2. Radial feed switch
3. Feed-thru inserts
4. Three surge arresters for radial feed circuits.

5. Biodegradable less-flammable liquid-insulated

6. Provide a spare 5” conduit in the high voltage section extending 5ft out from the transformer pad.

G401003 SWITCHES, CONTROLS AND DEVICES

Provide 4-way SF6 Insulated Pad Mounted Switchgear configured with the existing underground distribution system.

G401006 UNDERGROUND ELECTRIC CONDUCTORS

Provide a medium voltage and a 600 volt secondary underground electrical power distribution systems to meet the connection requirements as indicated in paragraph G4010 "Electrical Distribution".

Underground medium voltage conductor are to be rated 5kV, copper, 133% EPR insulation.

G401007 DUCTBANKS, MANHOLES, HANDHOLES AND RACEWAYS

Provide a system of concrete encased ductbanks, handholes and manholes for all underground power wiring in accordance with UFC 3-550-01.

Primary Distribution Conduits (Medium Voltage) (along main run and on laterals between underground structures and associated equipment) – size as needed to satisfy conduit fill and jam ratio criteria for the selected conductor size and voltage class, with 5 in minimum.

Secondary Distribution Conduits (Low Voltage) – size as needed to satisfy conduit fill and jam ratio criteria for the selected conductor size, with 4 in minimum for conductor sizes 500 kcmil and larger.

Locate manholes/handholes in accordance with UFC 3-550-01 section 3-11.5. Provide where any of three conditions exists:

a. Where splices are required.
b. Where duct lines change direction unless the field manufactured longsweep bends having a minimum radius of 25 feet can be used for a change of direction of more than 5 degrees, either horizontally or vertically, using a combination of curved and straight sections with the maximum manufactured curved sections of no more than 30 degrees,
c. Within 100ft (30m) of every riser pole, pad mounted transformer, pad mounted switch or unit substation unless a calculation is provided to justify a greater distance. The distance must not exceed 200 ft.

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.

Provide AMI meter Shark 270.

G401010 CATHODIC PROTECTION SYSTEMS

Provide cathodic protection as required.

G401011 EQUIPMENT REQUIREMENTS FOR COASTAL AND HIGH HUMIDITY AREAS

Provide exterior equipment designed for coastal and high humidity areas.

G4020 SITE LIGHTING

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

G402001 EXTERIOR LIGHTING FIXTURES AND CONTROLS

Provide lighting for walkways, covered walkways and landscape areas.

Provide LED type lighting fixtures.

Provide an automatic lighting control system for exterior site lighting and building mounted fixtures utilizing lighting contactors, time switches, and photocell switches such that lighting will automatically turn "ON" at a designated time set by the user and turn "OFF" at a designated time set by the user.

Provide exterior LED building mounted lights (full-cutoff) at all building entry/exit doors, and for safety and security lighting around the building perimeter. The contractor will design the exterior lighting in accordance with the IESNA Lighting Handbook and UFC 3-530-01.

Provide exterior wall mounted light fixture outside each room entrance exterior door.

Exterior lighting must comply with environmental requirements documented in the approved site documentation, including the Regional Environmental Checklist and CATEX (Appendix K-1). Lighting selection and distribution avoids adverse impacts to bats, migratory birds, and sea turtle nesting and hatching activities. In accordance with UFC 3-530-01, Section 4-2.1.1, exterior luminaires in sensitive environments must utilize monochromatic amber LED sources. UFC guidance states: “Use monochromatic amber LEDs in place of low pressure sodium (LPS) for sensitive environments such as wildlife habitat, wildlife nesting, or to meet dark-sky requirements (observatories).”

G402004 LIGHTING POLES

Provide aluminum complete with foundations for site lighting.

G402005 UNDERGROUND ELECTRIC CONDUCTORS

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

G402006 DUCTBANKS, MANHOLES AND HANDHOLES

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

G402007 GROUNDING SYSTEMS

Provide a complete grounding system for all site lighting systems.

G4030 SITE COMMUNICATION AND SECURITY

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

G403001 TELECOMMUNICATIONS SYSTEMS

The connection point for the site telecommunications systems must be underground at the Admin Bldg and extended to the project site underground in a system of handholes and ductbank to the telecommunications equipment room in Bldg.534.

Provide 2-24 strand singlemode fiber optic cable between the connection point Bldg.534 and building entrance facilities in the Admin Bldg.

G403002 CABLE TV SYSTEMS (CATV)

The existing CATV system is to remain.

G403003 CABLES AND WIRING

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

G403004 DUCTBANKS, MANHOLES AND HANDHOLES

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

G403006 TV CAMERAS AND MONITORS

Provide a system of cable supporting structures, including empty conduits with pull strings, junction boxes, outlet boxes, outlet connectors, and cover plates for exterior TV and security camera system.

Provide camera outlets in the locations identified by the Contracting Officer.

G403007 ELECTRONIC SECURITY SYSTEMS (ESS)

Provide exterior ESS including all conduit and wiring, underground structures, termination equipment, as required for a complete and usable system.

G403009 GROUNDING SYSTEMS

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

G403010 INDUSTRIAL CONTROL SYSTEMS (ICS)

The connection point for the site ICS Infrastructure must be underground and extended to the project site underground in a system of manholes and ductbank to the telecommunications equipment room.

Provide 8 strand mode fiber optic cable between the connection point and the telecommunications equipment room.

Provide 3 empty 4 inch conduits with pull strings for Government provided cable.

-- End of Section --

PART 4 – PERFORMANCE TECHNICAL SPECIFICATIONS

A10 FOUNDATIONS
A20 BASEMENT CONSTRUCTION
B10 SUPERSTRUCTURE
B20 EXTERIOR ENCLOSURE
B30 ROOFING
C10 INTERIOR CONSTRUCTION
C20 STAIRS
C30 INTERIOR FINISHES
D10 CONVEYING
D20 PLUMBING
D30 HVAC
D40 FIRE PROTECTION
D50 ELECTRICAL
E10 EQUIPMENT
E20 FURNISHINGS
F10 SPECIAL CONSTRUCTION
F20 SELECTIVE BUILDING DEMOLITION
G10 SITE PREPARATIONS
G20 SITE IMPROVEMENTS
G30 SITE CIVIL/MECHANICAL UTILITIES
G40 SITE ELECTRICAL UTILITIES
Z10 GENERAL PERFORMANCE TECHNICAL SPECIFICATION

SECTION A10

FOUNDATIONS
12/18

A10 GENERAL

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

A10 1.1 DESIGN GUIDANCE

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

A10 1.1.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

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

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS Section 31 00 00	Excavation and Fill

A10 1.2 GENERAL REQUIREMENTS

A10 1.2.1 Earthwork

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

UFGS Section 31 00 00 Earthwork

A10 1.2.2 Geotechnical Report

A10 1.2.2.1 Subsurface Soils Information

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

A10 1.2.2.2 Contractor-provided Geotechnical Engineer

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

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

A10 1.2.2.3 Contractor-Provided Geotechnical Report

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

a. The project site description, vicinity map and site map indicating the location of borings and any other sampling locations. Provide 24 hour groundwater observations for at least 20% of the borings, minimum one boring. Provide notes explaining any abbreviations or symbols used and describing any

special site preparation requirements.

b. Results of all applicable field and laboratory testing, whether Government or Contractor-provided. Address existing subsurface conditions, selection and design of the foundation and floor slab, all underground construction including utility installation and all other site-specific requirements (such as soil stabilization and slope stability).

c. Engineering analysis, discussion and recommendations addressing:

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

2) Bearing Capacity Analysis.

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

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

5) Sheeting and shoring considerations, as applicable

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

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

8) Calculations to support conclusions and recommendations.

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

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

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

A10 1.2.2.4 Geotechnical Site Data required in Design Drawings

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

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

A10 1.2.3 Pile Driver Analyzer (PDA)

If deemed necessary by the Contractor's Geotechnical Engineer, the dynamic wave equation method of analysis, pile driver analyzer, must 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. Provide PDA or static load test(s) for piles with required allowable design capacity equal to or greater than 40 tons.

A10 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory construction and system performance of the foundations via Performance Verification Testing, and by field inspection, as detailed in this section of the RFP and in Part 2 Section 01 45 00, *Quality Control*. Provide special tests and special inspections in accordance with Part 2 Section 01 45 00.

A10 1.3.1 Earthwork

Perform quality assurance for earthwork in accordance with International Building Code (IBC) Chapter 17 and UFGS Section 31 00 00. A competent person, as defined by COE EM 385-1-1, under supervision of a registered Professional Engineer is required to provide inspection of excavations and soil/groundwater conditions throughout construction. The Engineer must perform periodic site visits throughout construction to assess site conditions. The Engineer, with the concurrence of the Contractor and the Contracting Officer, must update the excavation, sheeting, shoring, and dewatering plans as construction progresses to reflect actual site conditions and submit the updated plan and a written report (with professional stamp) at least monthly informing the Contractor and the Contracting Officer of the status of the plan and an accounting of Contractor adherence to the plan; specifically addressing any present or potential problems. The Engineer must be available to meet with the Contracting Officer at any time throughout the contract duration. The Contractor will bear all costs of the Engineer.

A10 1.3.2 Piles

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

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

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

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

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

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

A10 1.4 DESIGN SUBMITTALS

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

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

UFGS Section 31 00 00 *Earthwork*

A10 1.5 CONSTRUCTION SUBMITTALS

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

submittals as a minimum:

All structural elements necessary for construction

Contractor-provided geotechnical report

Controlled fill or backfill material tests

Test pile and production pile installation records

Pile load testing reports

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

A1010 STANDARD FOUNDATIONS

A1010 1.1 SHEETING AND SHORING

Provide sheeting and shoring as required. Provides sheeting and shoring plans signed by the Contractor's Geotechnical Engineer.

A1010 1.2 TERMITE CONTROL

A1010 1.2.1 Termite Control Barrier System

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

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

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

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

A1010 1.2.2 Warranty

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

a. Perform treatment as necessary for elimination of subterranean termite infestation;

b. Repair damage caused by termite infestation;
c. Reinspect the building approximately 180 calendar days after the repair.

A1010 1.2.3 Visual Inspection Guide

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

A101001 WALL FOUNDATIONS

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

A101002 COLUMN FOUNDATIONS AND PILE CAPS

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

A1020 SPECIAL FOUNDATIONS

A102001 PILE FOUNDATIONS

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

A102001 1.1 DRIVING EQUIPMENT

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

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

Pile driving equipment must 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, provide a minimum clear distance of five inches between the heads of piles and the edges of pile caps.

Locate top of sheet piles at cutoff elevation within 1/2 inch

horizontally and 2 inches vertical of the location indicated. Manipulation of the piles is not permitted.

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

A102001 1.3 MISLOCATED AND DAMAGED PILES

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

A102001 1.4 PILE SPACING

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

A102001 1.5 COATED PILES

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

A102002 CAISSONS

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

A102003 UNDERPINNING

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

A102004 DEWATERING

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

A102005 RAFT FOUNDATIONS

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

A102006 PRESSURE INJECTED GROUTING

If required, pressure inject grout as required in accordance with the requirements of this section and other portions of this RFP.

A1030 GROUND FLOOR SLABS

A103001 STANDARD SLAB ON GROUND

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

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

A103003 TRENCHES

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

A103004 PITS AND BASES

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

A103005 FOUNDATION DRAINAGE

A103005 1.1 PERIMETER FOUNDATION DRAINAGE

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

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

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

A103090 OTHER SLAB ON GROUND

A103090 1.1 BLOCK OR BOARD PERIMETER INSULATION

Provide only thermal insulating materials recommended by manufacturer

for perimeter insulation. Provide one of the board or block thermal insulations listed below conforming to the following standards:

a. Extruded Preformed Cellular Polystyrene: ASTM C 578

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

-- End of Section --

SECTION A20

BASEMENT CONSTRUCTION
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A20 GENERAL

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

A20 1.1 DESIGN GUIDANCE

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

A20 1.1.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

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

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS Section 31 00 00 Excavation and Fill

A20 1.2 GENERAL REQUIREMENTS

A20 1.2.1 Required Specifications

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

Section 31 23 00.00 20, *Excavation and Fill*

A20 1.2.2 Geotechnical Report

A20 1.2.2.1 Contractor-provided Geotechnical Engineer

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

A20 1.2.2.2 Subsurface Soils Information

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

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

A20 1.2.2.3 Contractor-Provided Geotechnical Report

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

a. The project site description, vicinity map and site map.
b. Results of all the field and laboratory testing, whether Government or Contractor-provided.
c. Engineering analysis, discussion and recommendations addressing:
d. Settlement
e. Bearing Capacity
f. Foundation selection and construction considerations

(shallow, deep, special); dimensions, and installation procedures.

g. Site preparation (earthwork procedures and equipment), compaction requirements, building slab preparation (as applicable), soil sensitivity to weather and equipment, and groundwater influence on construction
h. Sheeting and shoring considerations, as applicable
i. Pavement design parameters, actual or assumed, including recommended thicknesses and materials, be for design or for proposed modifications to the RFP provided pavement design only
j. Haul routes and stockpile locations for earthwork, as applicable
k. Calculations to support conclusions and recommendations
l. Present recommendations on a structure-by-structure basis

Provide the Geotechnical Report signed by a registered Geotechnical Engineer.

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

A20 1.2.2.4 Geotechnical Site Data required in Design Drawings

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

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

A20 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory construction and system performance via Performance Verification Testing, as detailed in this section of the RFP. Provide special tests and special inspections in accordance with Part 2 Section 01 45 00, *Quality Control*.

A20 1.3.1 Earthwork

Perform quality assurance for earthwork in accordance with International Building Code (IBC) Chapter 17 and UFGS Section 31 00 00. If a registered Professional Engineer is required to provide inspection of excavations and soil/groundwater conditions throughout construction, the Engineer must perform pre-

construction and periodic site visits throughout construction to assess site conditions. The Engineer, with the concurrence of the Contractor and the Contracting Officer, must update the excavation, sheeting, shoring, and dewatering plans as construction progresses to reflect actual site conditions and must submit the updated plan and a written report (with professional stamp) at least monthly informing the Contractor and the Contracting Officer of the status of the plan and an accounting of Contractor adherence to the plan; specifically addressing any present or potential problems. The Engineer must be available to meet with the Contracting Officer at any time throughout the contract duration. Provide the services of the Engineer at no additional cost to the Government.

A20 1.4 DESIGN SUBMITTALS

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

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

UFGS 31 00 00, *Earthwork*

A20 1.5 CONSTRUCTION SUBMITTALS

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

Contractor-provided geotechnical report

Controlled fill or backfill material tests

All structural elements necessary for construction

A2010 BASEMENT EXCAVATION

A201001 EXCAVATION FOR BASEMENTS

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

A201002 STRUCTURE BACKFILL AND COMPACTION

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

A201003 SHORING

Provide shoring and sheeting as required in accordance with the requirements of this section and other portions of this RFP. Provide shoring and sheeting plans signed by the Contractor's Geotechnical/Structural Engineer.

A2020 BASEMENT WALLS

A202001 BASEMENT WALL CONSTRUCTION

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

A202002 MOISTURE PROTECTION

A202002 1.1 BUILT-UP BITUMINOUS WATERPROOFING

A202002 1.1.1 Environmental Conditions

Apply the primers and waterproofing specified herein when the ambient temperature is above 40 degrees F.

A202002 1.1.2 Liquid Asphalt

Deliver bulk liquid asphalt in fully insulated, heated transport tanker vehicles with circulating pump devices. Maintain the temperature of the liquid asphalt between 400 and 450 degrees F during storage, provided the transport and storage time does not exceed 12 hours. If the transport and storage time exceeds 12 hours, lower the temperature to between 300 and 325 degrees F at the time the 12 hours are exceeded. Use liquid asphalt within 36 hours after loading in the transport tanker.

A202002 1.1.3 Materials

a. Bitumen - Asphalt; American Society for Testing and Materials (ASTM) D 449, Type I.
b. Bituminous Plastic Cement - ASTM D 4586, Type I for asphalt.
c. Membrane Fabric

The following requirements apply:

Felt or Fabric Material	Saturant or Impregnant	Specification
Glass (felt) mat	Asphalt	ASTM D 2178, Type III
Reinforcing glass fabric	Asphalt	ASTM D 1668, Type I

d. Nails - Galvanized roofing nails.
e. Primer - ASTM D 41 for asphalt.

f. Protection Board - ASTM D 517, plain, asphalt plank; ASTM C 208, construction grade building board, 1/2 inch thick, asphalt saturated or coated; ASTM C 726, 7/16 inch thick, covered on one side with waterproof paper or asphalt-saturated felt.

A202002 1.2 ELASTOMERIC SHEET WATERPROOFING

A202002 1.2.1 Environmental Conditions

Do not apply waterproofing during inclement weather or when there is ice, frost, surface moisture, or visible dampness on the surface to receive waterproofing and when ambient and surface temperatures are 40 degrees F or below. The restriction on the application of waterproofing materials when ambient and surface temperatures are below 40 degrees F will be waived if the Contractor devises a means, approved by the Contracting Officer, of maintaining the surface and ambient temperatures above 40 degrees F.

A202002 1.2.2 Butyl Rubber Sheeting

Not less than 60 mils minimum thickness.

A202002 1.2.2.1 Butyl Rubber Sheeting Performance Requirements

a. Thickness Tolerance, ASTM D 412: Plus or minus 10 percent;
b. Specific Gravity, ASTM D 297: 1.20, plus or minus 0.05;
c. Tensile Strength, ASTM D 412: 1200 psi minimum;
d. Tensile Stress at 300 percent elongation, ASTM D 412: 600 psi minimum;
e. Elongation, ASTM D 412: 300 percent minimum;
f. Tear Resistance, Die C, ASTM D 624: 125 pound force per inch (lbf/inch) minimum;
g. Shore A Hardness, ASTM D 2240: Five-second interval before reading; 60 plus or minus 10;
h. Ozone Resistance, ASTM D 1149: No cracks, 7 days - 50 pphm - 100 degrees F, 20 percent elongation;
i. Heating Aging-Accelerated, ASTM D 573: Tensile retention, 60 percent of minimum original elongation retention; 60 percent of minimum original requirement; 7 days, 240 degrees F.
j. Butyl Identification, ASTM D 471, Tricresyl Phosphate Immersion: Maximum volume swell 10 percent, 70 hrs, 212 degrees F;
k. Low Temperature Flexibility, ASTM D 746: No failure at -40 degrees F;
l. Water Absorption, ASTM D 471: +1 percent maximum. 7 days, 158 degrees F;
m. Exposure to Fungi and Bacteria in Soil, Minimum 16 Weeks: Unaffected; and
n. Water Vapor Transmission, 80 Degrees F Permeance, ASTM E 96, Procedure B or BW: 0.15 perms maximum.

A202002 1.2.2.2 Adhesive, Cement, and Tape for Use with Butyl Rubber

Provide as recommended by the butyl rubber waterproofing membrane manufacturer.

A202002 1.2.3 Composite, Self-Adhering Membrane Sheeting

Cold applied composite sheet consisting of rubberized asphalt and cross laminated, high-density polyethylene film. Not less than 60 mils minimum thickness is required.

A202002 1.2.3.1 Composite, Self-Adhering Sheeting Performance Requirements

a. Tensile Strength, ASTM D 412, Die C: 250 psi minimum;
b. Ultimate Elongation, ASTM D 412, Die C: 200 percent minimum;
c. Water Vapor Transmission, ASTM E 96 80 Degrees F Permeance, Procedure B: 0.1 perm maximum;
d. Pliability Degrees F, ASTM D 146: (180 Degrees Bend Over One Inch Mandrel): No cracks at minus -25 degrees F;
e. Cycling Over Crack at Minus 15 Degrees F: Membrane is applied and rolled across two primed concrete blocks with no separation between blocks. Crack opened and closed from zero to 1/4 inch. No effect at 100 cycles;
f. Puncture Resistance, ASTM E 154: 40 lb. minimum;
g. Lap Adhesion at Minimum Application Temperature, ASTM D1876 Modified, 5 lbs/in.(880 N/m);
h. Peel Strength, ASTM D 903: Modified, 9 lbs/in;
i. Resistance to Hydrostatic Head, ASTM D 5385: 231 ft of water
j. Water Absorption, ASTM D 570; 0.1% maximum.

A202002 1.2.3.2 Primer

Asphalt composition, ASTM D 41, or synthetic polymer in solvent as recommended by the membrane manufacturer.

A202002 1.2.3.3 Mastic

Polymer modified asphalt in suitable solvent of trowel-grade consistency and as recommended by the membrane manufacturer.

A202002 1.2.4 Protection Board

Three-dimensional, high impact resistant polymeric grid with woven monofilament drainage fabric bonded to the grid.

A202003 BASEMENT WALL INSULATION

A202003 1.1 BLOCK OR BOARD INSULATION

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

a. Cellular Glass: ASTM C 552
b. Extruded Preformed Cellular Polystyrene: ASTM C 578
c. Unfaced Preformed Rigid Polyurethane and Polyisocyanurate Board: ASTM C 591
d. Faced Rigid Cellular Polyisocyanurate and Polyurethane Insulation: ASTM C 1289
e. Type I Aluminum Foil on both major surfaces. Class 1 - Non-reinforced core foam.

A202003 1.2 BLANKET INSULATION

ASTM C 665, Type I, blankets without membrane coverings; with a thermal resistance value, which will be sufficient to meet the applicable building code and energy budget for the facility. The insulation material must not contain asbestos materials.

A202003 1.2.1 Recycled Materials

Provide Thermal Insulation containing recycled materials to the extent practicable, provided the material meets all other requirements of this section. The minimum required recycled materials content by weight are:

Rock Wool: 75 percent slag

Fiberglass: 20 to 25 percent glass cullet

A202004 INTERIOR SKIN

Comply with Section C30, *Interior Finishes*.

-- End of Section --

SECTION B10

SUPERSTRUCTURE
12/18

B10 GENERAL

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

B10 1.1 DESIGN GUIDANCE

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

B10 1.1.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s): UFC 3-101-01, Architecture UFC 3-301-01, Structural Engineering)
UFC 4-023-03	Design of Buildings to Resist Progressive Collapse

B10 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Verify satisfactory construction and system performance via Performance Verification Testing, as detailed in this section of the RFP. Provide special tests and special inspections in accordance with Part 2 Section 01 45 00, *Quality Control*. The cost of all testing is included in the Contract.

B10 1.3 DESIGN SUBMITTALS

Provide design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine Corps Design Procedures*, UFC 3-101-01, *Architecture*, and UFC 3-301-01, *Structural Engineering*.

B10 1.4 CONSTRUCTION SUBMITTALS

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

All structural elements necessary for construction of the superstructure.

B1010 FLOOR CONSTRUCTION

B101001 STRUCTURAL FRAME

Structural frame elements may include columns, girders, beams, trusses, joists, moment frames, shear walls, and bracing. See Section B20, *Exterior Enclosure*, for additional requirements for exterior walls used as load-bearing walls or shear walls.

B101002 STRUCTURAL INTERIOR WALLS

Provide structural interior walls as required in accordance with the requirements of this section and other portions of this RFP. See Section C10, *Interior Construction*, for additional requirements.

B101003 FLOOR DECKS AND SLABS

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

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
06/23

B20 GENERAL

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

B20 1.1 DESIGN GUIDANCE

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

Industry standards, codes, and Government standards referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Federal Facility Criteria (FFC) at the Whole Building Design Guide (WBDG) website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the referenced standard at the time of contract award.

B20 1.1.1 Industry Standards and Codes

NATIONAL LUMBER GRADES AUTHORITY (NLGA)

B20 1.1.2 Government Standards

Military Handbook 1013/1A, *Design Guidance for Physical Security of Facilities*

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s): UFC 3-101-01, Architecture)
UFC 1-200-02	High Performance and Sustainable Building Requirements

B20 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory exterior enclosure system performance via Performance Verification Testing, and by field inspection as detailed in this section of the RFP. Provide special tests and special inspections in accordance with Part 2 Section 01 45 00, *Quality Control*. The cost of all testing is included in the Contract.

B20 1.2.1 Required Brick Masonry Testing and Field Samples

a. Where field testing is required, determine masonry strength in accordance with American Concrete Institute (ACI) 530.1.

b. Field Samples: Masonry Panel Requirements - At the job site submit for approval by the Designer of Record, a sample masonry panel minimum 8 feet (2.4 meters) long by a minimum of 4 feet (1.2 meters) high. Actual Sample size will be determined by number of components in the sample wall but provide a span of at least 4 feet (1.2 meters) of uninterrupted brickwork and 2 feet (.6 meters) above wall openings. The approved sample must exhibit the standard for workmanship and materials for the project. The sample panel must include brick coursing, bond, weep holes, flashing, thickness, anchors, joint reinforcing, wall ties, rigid-board insulation, intersection of walls, bond beams, expansion and control joints, and tooling of joints, range of color, texture of masonry, and mortar color; or cold-formed steel framing, insulation, fiberglass-faced gypsum sheathing, air barrier, moisture barrier/vapor retarders, exterior enclosure barrier connections to adjoining construction, sealing of exterior enclosure barrier penetrations, sealant, masonry ties and anchors, and tooling of joints, the range of color and texture of brick veneer, and the color of mortar. Protect the sample panel from damage at the site until masonry work is complete and approved, at which time the panel must be removed from the site. If there are windows or curtain walls in the project which interface with the masonry, a cut-away sample window or curtain wall mock-up must be installed in the masonry field panel, with all accessories, finishes, and trim (see B20 1.2.4 and 1.2.5). Masonry work must match the approved sample.

B20 1.2.2 Air Barrier Field Sample

Designate a portion of the project that reveals the various edge, seam, transition, and penetration conditions that the air barrier is exposed to. Determine this location with the Contracting Officer and obtain approval of the sealing methods employed on the project from the air barrier Manufacturer. Leave sample area exposed to view as long as practical to serve as a construction standard and comparison of future air barrier construction on the project. Before construction covers the sample area, provide detailed photographs of the air barrier details for future

reference.

B20 1.2.3 Air Barrier Performance

Provide air barrier inspection on all projects and air barrier performance testing when required in RFP Part 3, Section B20.

B20 1.2.3.1 Air Barrier Inspection

Coordinate all subcontractors that provide part of the air barrier construction to provide an air tight barrier. Review the air barrier prior to being covered by subsequent construction to confirm that the air barrier complies with the following requirements;

a. Prior to applying an air barrier, confirm that the substrate complies with conditions required by the applied air barrier material manufacturer.
b. Air barrier must create a continuous barrier, without gaps, "fish mouths", holes, unsealed seams, or unsealed penetrations.
c. Air barrier components are compatible and capable of being permanently connected to form an air tight barrier.
d. Construction of the air barrier complies with air barrier design as indicated in the Basis of Design and exterior enclosure barrier drawings.
e. Air barrier is installed in accordance with manufacturer's standard details available on the Air Barrier Association of America (ABAA) website named "Air Barrier Materials, Components, Assemblies & Systems" and found at the following web link; http://www.airbarrier.org/materials/assemblies_e.php

B20 1.2.3.2 Air Barrier Performance Testing

Provide air barrier testing and repair as follows (coordinate with infrared thermal testing):

a. Provide a testing plan as a part of the Commissioning Plan and notify the Contracting Officer 7 working days before the testing will take place. Do not test the building until verifying that the continuous air barrier is in place and installed without failures in accordance with installation instructions so that repairs to the continuous air barrier, if needed to comply with the required air leakage rate, can be done in a timely manner.

   Also coordinate building access during the test with the Contracting Officer. Perform pretest inspection with all parties involved in the test and possible repairs of the building enclosure. Record pretest conditions and utilize pictures to assist in the documentation.
b. Designer of Record (DOR) must utilize UFGS Section 01

91 19, *Building Enclosure Commissioning*,and Contractor must perform testing as described in that specification. Where conflicts exist between the UFGS Section 01 19 19 and this performance specification, UFGS Section 01 91 19 will govern. The air leak flow rate must not exceed 0.25 CFM at 75 Pa per square foot (0.076 cmm 75 Pa per square meter) of building enclosure area including roof or ceiling, walls and floor as provided by the DOR.

Method 1: This test consists of measuring the flow rates required to establish 12 positive and 12 negative building pressures from at least 25 Pa to at least 50 Pa. Take at least 12 bias pressure readings across the building enclosure averaged over 5 seconds each before and after the test. None of these readings must exceed 30% of the minimum test pressure.

Method 2: this test consists of measuring the flow rates required to establish 12 positive building pressures from at least 50 Pa to at least 75 Pa. Take at least 12 bias pressure readings across the building enclosure averaged over 5 seconds each before and after the test. None of these readings must exceed 20% of the minimum test pressure.

The test results must be either pass or fail. Provide the theoretical size of the opening that leaks the same amount as the building enclosure at 75 Pa, to facilitate the search for leaks and repair of the exterior enclosure.

c. Provide infrared thermography to determine air leakage paths if facility fails to retain the required air pressure in the test above. Utilize infrared cameras with a resolution of 0.1 degree C or better.

Perform infrared thermography in accordance with ISO 6781:1983 and American Society for Testing and Materials (ASTM) C1060 and B20 1.2.4 *Thermal Envelope Performance Testing (Infrared Thermography)*. Determine air leakage pathways in accordance with ASTM E1186 *Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems*, and perform corrective work as necessary to achieve the whole building air leakage rate specified.

Modify construction to stop identified air leakage until target is reached. Correct air path leaks at the source of the leak, do not use sealant to close air leakage paths that are required to be opened for maintenance of the facility such as fixtures, switches covers, receptacle covers, access doors, etc.

d. Seal air leaks in the following order of priority:

1. Top of the building. These include attics, roof/wall intersections, penthouse doors and walls, HVAC equipment.
2. Bottom of the building. These include ground floor access doors and inspection hatches, exhaust and air intake vents, service penetrations of enclosure, crawl spaces.
3. Vertical shafts. These include gasket stairwell fire doors, fire hose cabinets and recessed toilet accessories connected to vertical shaft, vertical and horizontal utility penetrations in service rooms, elevator rooms and shafts.
4. Exterior walls. These include weather strip doors and windows, exhaust fans and ducts, service penetrations, electrical receptacles, wall base.

B20 1.2.4 Thermal Envelope Performance Testing (Infrared Thermography)

Where required in RFP Part 3 or B20 1.2.3.2 *Air Barrier Performance Testing*, provide infrared thermal testing and repair as follows (coordinate with air barrier testing):

a. Test the building envelope using Infrared Thermography technology. Complete thermography testing in accordance with the requirements of ASTM E1186 and ISO 6781. The Contracting Officer will witness the testing. Testing must occur just before the building air tightness test. Testing must also occur during the air tightness test so that areas of building air leaks are detected. If the building air tightness test is failed, repeat thermographic testing just before and during subsequent air tightness tests until the air tightness test is successful.
b. Thermographer Qualifications: the lead thermographer must have qualifications meeting requirements in UFGS Section 01 91 19.
c. Thermography Test Procedures: Submit detailed test procedures indicating the test apparatus, the test methods and procedures, and the analysis methods to be employed not later than 60 days after Notice to Proceed.
d. Thermography Test Report: Provide a report. The report must include thermographs in color and a color temperature scale to define the temperature indicated by the various colors. The report must identify the high temperature reading, the outdoor air temperature, the building indoor air temperature, and the wind speed and direction. The report must note any areas of compromise in the building envelope, and must note all actions required and taken to correct those areas.
e. Final Test: Final thermography test report must demonstrate the problem areas have been corrected. Submit the complete test and analysis for review and approval.

B20 1.2.5 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 1.2.6 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 1.2.6.1 Manufacturing Plant Sampling And Testing for Precast

Plant Quality Control - PCI MNL-117 for PCI enrolled plants. Where panels are manufactured by specialists in plants not currently enrolled in the PCI "Quality Control Program," provide a product quality control system in accordance with PCI MNL-117 and perform concrete and aggregate quality control testing using an approved, independent commercial testing laboratory. Submit test results to the Contracting Officer.

a. Aggregate Tests: ASTM C 33. Perform one test for each aggregate size, including determination of the specific gravity.
b. Strength Tests: ASTM C 172. Provide ASTM C 39 and ASTM C 31/C 31M compression tests. Perform ASTM C 143 slump tests. Mold six cylinders each day or for every 20 cubic yards (15 cubic meters) of concrete placed, whichever is greater. Perform strength tests using two cylinders at 7 days and two at 28 days. Cure four cylinders in the same manner as the panels and place at the point where the poorest curing conditions are offered. Moist cure two cylinders and test at 28 days.
c. Changes in Proportions: If, the compressive strength falls below that specified, adjust the mix proportions and water content and make necessary changes in the temperature, moisture, and curing procedures to secure the specified strength. Notify the Contracting Officer of all changes.
d. Strength Test Results: Evaluate compression test results at 28 days in accordance with ACI 214 using a coefficient of variation of 20 percent. Evaluate the strength of concrete by averaging the test results (two specimens) of standard cylinders tested at 28 days. Not more than 20 percent of the individual tests must have an average compressive strength less

than the specified ultimate compressive strength.

B20 1.2.6.2 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 1.2.7 Window Sample Mock-Up

a. Provide mock-up of one (1) typical combination window unit to be used within the project and conduct a field mock-up test in strict compliance with American Architectural Manufacturers Association (AAMA) 502 method A and method B. Each opening must be tested to achieve performance of American Society of Civil Engineers (ASCE) 7 calculated requirements (PSF or Kg/m2) for water resistance, which must not exceed .667 % of the products capable water based on AAMA 101/I.S.2. Allowable rates of air leakage for field testing must be 1.5 times applicable AAMA 101/I.S.2 rate for the Product Type and Performance Class.

b. Opening is to be tested under "Quality Control" testing by a designated independent testing agency.

1) Schedule mock-up installation sufficiently in advance of need to allow adequate time for cure of sealants, testing and reconstruction, if needed, without delaying the project.

2) Build mock-up in building enclosure wall in location selected by Owner and Architect.

3) Modify mock-up construction and perform additional tests as required to achieve specified minimum acceptable results. If corrections are not adequate, construct new mock-up, at written direction of Owner and Architect. Co-ordinate construction of mock-up with other involved trades.

4) Approved mock-ups may become part of completed Work if undisturbed at time of Substantial Completion.

5) Flood test Mock-up window subsill and obtain approval of DOR prior to installing window unit.

B20 1.2.8 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 must be tested to achieve performance of ASCE 7 calculated requirements (PSF or Kg/m2) for water resistance, which must not exceed the derived water expectation of 0 infiltration at the calculated Design Pressure. Allowable rates of air leakage for field testing must 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 enclosure 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.

Protect the sample curtain wall from damage at the site until curtain wall construction work is complete and approved, at which time the panel must be removed from the site. On projects where the curtain wall interfaces with masonry walls, a cut-away sample curtain wall must be installed with the masonry sample panel. Curtain wall installations must match the approved sample.

Water Penetration: No water penetration must 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

Provide design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine CorpsDesign Procedures*, UFC 3-101-01, *Architecture,* and UFC

3-301-01, *Structural Engineering*.

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

UFGS Section 08 34 16.10, *Horizontal Rolling Steel Doors*

UFGS Section 08 34 16.20, *Vertical Lift Fabric Doors*

B20 1.4 CONSTRUCTION SUBMITTALS

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

Shop drawings for reinforcing steel in masonry walls, doors, door hardware, windows, storefront, curtainwall, glazing, paint, exterior enclosure barrier systems, and visible exterior materials.

All structural elements necessary for construction.

B20 1.4.1 Manufacturer's Verification Inspection Documentation for Galvanized Steel

Submit manufacturer's verification inspection documentation for all galvanized steel in accordance with ASTM A123, ASTM A 153, and ASTM A 653.

B20 1.4.2 Field Inspection of Field-erected Concrete Panels

a. Perform field inspection of panel welded connections. Furnish the services of AWS-certified welding inspector for erection inspections. Welding inspector must visually inspect all welds and identify all defective welds.
b. Notify the DOR in writing of defective welds, bolts, nuts and washers within 7 working days of the date of inspection. Remove all defective connections or welds and re-welded or repaired as required by the DOR.

B20 1.4.3 Sustainable Construction Submittals

Submit sustainable construction submittals in accordance with Part 2 Section 01 33 29, *Sustainability Requirements and Reporting*.

B2010 EXTERIOR WALLS

Provide exterior wall construction that consists of exterior skin system of non-structural outside face elements with rain-screen back-up wall systems that include; flashing (embedded, exposed, and thru-wall), a water resistive barrier, moisture barrier/ vapor retarder (if required), air barrier, and insulation systems with interior skin system materials to provide a protective finish on the inside face of exterior walls. Provide all components necessary for a shingled water resistive barrier to direct water that would penetrate the wall to be directed to the outside of the wall. Provide exterior enclosure components and barriers in accordance with UFC 3-101-01, *Architecture*.

Design all work to comply with UFC 3-101-01, *Architecture*, and UFC 3-301-01, *Structural Engineering*, and the following requirements:

a. Vapor Pressure and Hygrothermal Analysis - Perform a job specific vapor pressure and hygrothermal analysis in accordance with UFC 3-101-01, *Architecture*. The conclusion of the analysis must indicate if a moisture barrier/ vapor retarder is required, the appropriate locations of needed moisture barrier/ vapor retarder, and anticipated dew-point locations in the exterior enclosure during different critical times of the year.
b. Wind Loads - Provide wind load calculations for exterior cladding in accordance with UFC 1-200-01 and UFC 3-301-01 with comparative analysis of the cladding system to be provided.
c. Water Penetration - No water penetration must occur at a pressure of 8 psf (39 Kg/m2) of fixed area when tested in accordance with ASTM E 331.
d. Insulating Value – Comply with UFC 3-101-01, *Architecture*, for the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) 90.1 standards to determine the minimum insulating value of the complete wall system.

B201001 EXTERIOR CLOSURE

B201001 1.1 MASONRY VENEER EXTERIOR WALL CLOSURE COMPONENTS

B201001 1.1.1 General Requirements

a. The masonry veneer includes the non-load bearing exterior walls of the structure, and also includes colored mortar, special shapes such as sills, headers, trim units and copings of brick masonry, precast concrete, concrete masonry units, or other approved materials. Tie the veneer to the backup wall system with a system that allows the veneer to move independently of the backup wall system, while being structurally supported. Allow for expansion and contraction of the veneer without cracking the exterior material.
b. Use running bond, tooled concave joints and full head joint weeps at 24 inches (610 mm) on center in the course immediately above the base flashing. Where rowlocks are permitted, slope rowlocks and project not less than 1/2 inch (13 mm) beyond the face of the wall to form a wash and drip. Where required, provide colored mortar conforming to ASTM C270. Provide special shapes where required.
c. Locate expansion/control joints and seal with proper backing material and ASTM C 920 polyurethane sealant, or

preformed foam or rubberized expansion joint closure. Conform to UFC 3-101-01 and BIA Technotes 18, 18A. Match joint color of the brick, unless DOR directs otherwise.

d. Conform to ACI 530.1 for masonry veneer installation, including cold weather construction. Antifreeze admixtures are not to be used.

e. Clean the masonry in accordance with manufacturer's instructions and BIA Technote 20.

f. Utilize BIA Technical Notes to design, detail, and construct brick masonry walls. This PTS section amends the BIA documents and takes precedence over similar BIA requirements. Substitute directive language in the place of BIA suggestive language as required in PTS Section Z10, *General Performance Technical Specifications*. The results of these wording substitutions change this document to required procedures.

B201001 1.1.2 Face Brick

a. Brick Masonry Appearance - Do not change source or supply of materials after brick manufacturing work has started. Blend all brick to produce a uniform appearance when installed. An observable "banding" or "layering" of colors or textures caused by improperly mixed brick is unacceptable.

b. Brick Type – Provide brick in accordance with ASTM C216, Grade SW, type FBX. Test rating of ASTM C67 must be "Not effloresced".

B201001 1.1.3 Split Faced or Ground Faced Masonry

ASTM C 90. If required, provide split faced or ground faced units, or split-ribbed units or scored-faced units.

B201001 1.1.4 Cast Stone Trim Units

a. Cast stone must be the product of a manufacturer regularly engaged in the manufacture of architectural cast stone (precast concrete building unit) products. Meet or exceed the requirements of ASTM C 1364.

b. Trim units of cast stone include sills, fascias, header units, copings and other trim units as required by the approved design.

B201001 1.1.5 The Wall Cavity

Comply with UFC 3-101-01, *Architecture* and BIA Technical Notes 21A, 21B, 21C, 28B.

B201001 1.1.6 Through-Wall Flashing Components

Provide through-wall flashing over all openings, spandrels, shelf angles, lintels, and built-in structural steel members. Provide through-wall flashing below all openings, parapets copings, sills, and at the base of the wall. Provide a method of weeping water collected by the through-wall flashing to the outside of

the wall.

a. Incorporate weep holes to align with through-wall flashing in cavity wall construction as required by UFC 3-101-01, *Architecture*, and BIA Technotes. Install flashing according to BIA Technotes 7, 7A, 7B, 21A, 21B, 21C, 28B, and SMACNA figures 4-1A and 4-1B. Extend metal drip edge flashing beyond the wall plane using a 1/4 inch (6 mm) preformed 45 degree angle turn down.
b. Provide flashing material as required by UFC 3-101-01, *Architecture* and the following: Provide flashing of 7 ounce copper flashing with a 3 ounce bituminous coating on each side or a fiberglass fabric bonded on each side of the copper sheet. Sixteen (16) ounce uncoated copper, 28 gauge Type 302 or 304 stainless steel is also acceptable. 'Flexible membrane flashing, plastic or PVC-based membrane flashing is prohibited. Lap and seal turndown solid metal drip edge flashing to through- wall flashing. Refer to "Flashing" in this section to find requirements for non-through-wall flashing.
c. Incorporate the through-wall flashing in the water resistive barrier and seal joints to flashing to form a shingled effect and direct water to the exterior to the exterior enclosure and away from back-up wall assembly.
d. Where flashing is not continuous, such as at masonry wall opening heads and sills, extend flashing four inches beyond each side of the opening and turn up ends to form a pan and prevent water from reentering the wall cavity.

B201001 1.1.7 Reinforcing in Veneer Layer

Reinforcing in the veneer layer must be galvanized in accordance with ASTM A 123/A123M, ASTM A153/A153M, or ASTM A653/A653M, Z275 (G90) coating, and be of sufficient size to eliminate damage to the veneer layer from wind and other live and dead loads imposed on the veneer layer.

B201001 1.2 METAL WALL PANEL EXTERIOR CLOSURE

B201001 1.2.1 General Wall Panel Requirements

a. Factory Color Finish – Provide panels with a factory applied, baked coating to the exterior and interior of metal wall panels and metal accessories. Provide exterior finish topcoat of 70 percent polyvinylidene fluoride (PVDF) resin with not less than 0.8 mil dry film thickness (DFT). Provide exterior primer that is standard with panel manufacturer but not less than 0.8 mil dry film thickness (DFT). Provide 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 must be the same coating and DFT as the exterior coating.
b. Wall system and attachments must 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 must be 1/60. Limit maximum deflection due to wind on steel wall panels and girts behind aluminum or steel wall panels to 1/120 of their respective spans, except that when interior finishes are used limit the maximum allowable deflection to 1/180 of their respective spans. The structural performance test methods and requirements of the wall system and attachments must be in accordance with ASTM E 1592.

c. Conformations - Non-insulated steel or aluminum wall panels must have configurations for overlapping adjacent sheets or interlocking ribs for securing adjacent sheets and fastened to framework using exposed or concealed fasteners, as specified. Provide sheets of sufficient length to cover the entire height of any unbroken wall surface when the length of run is 30 feet (9 meters) or less. Design wall systems with provisions 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 must 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 must be steel or aluminum factory-fabricated units with insulating core between metal face sheets securely fastened together and uniformly separated with rigid spacers. Provide factory color finish on panels. Insulation

must 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 must 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 must be not less than 8 inches (200 mm) wide and must be in one piece for unbroken wall heights.

Provide wall panel edge configurations with interlocking ribs for securing adjacent panels. Utilize factory fabricated corners and trim pieces at intersections with other materials. Fasten wall panels to framework using concealed fasteners. Install 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 must 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 must conform to ASTM C206, Type S. Utilize stainless steel or zinc corner beads, J-beads and other accessories for the system.

a. Unless specifically deleted, utilize an acrylic admixture or coating to give additional moisture suppression to control fungus growth for the system.
b. Sand aggregate for job-mixed base coat and job-mixed finish coat stucco must conform to ASTM C897.
c. Sand for Finish Coats: Natural color and graded within the limits shown above for basecoats, except that the sand must pass the No. 8 sieve, and for smooth finish the sand must pass the No. 30 sieve.
d. 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.
e. Portland Cement Stucco Finish Coat 3 to 5 parts sand (volume of sand per sum of cement and lime).
f. Portland cement plaster application must be in accordance with ASTM C 926. Furring and lath application must be in

accordance with ASTM C 1063.

g. Bonding Agents: ASTM C 932. Provide for exterior applications to masonry or concrete substrates.

h. Provide water resistive barrier under stucco in accordance with manufacturer’s recommendations and code requirements.

B201001 1.4 EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

EIMA TM 101 and 01 EIMA TM 101.86. Refer to the RFP Part 3 Project Program to determine if EIFS is used as the non-primary or the primary exterior finish material for the project. Job-fabricate the exterior insulation and finish system (EIFS) covering consisting of sheathing, water resistive barrier, moisture drainable insulation board system, reinforcing fabric, base coat, finish coat, adhesive, primer, accessories, flashing, sealant, and mechanical fasteners. The system components must 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. Install all materials using an applicator trained and approved by the system manufacturer in accordance with DOR-approved shop drawings and manufacturer's recommendations. The sealant applicator must also be approved by the EIFS manufacturer. Provide EIFS Class PB or Class PM. Do not use Class PB EIFS 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 must 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. Provide warranty 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. Do not use any layer of insulation less than 3/4 in (19 mm) thick. The maximum thickness of all layers must not exceed 4 in (101 mm). Insulation Board must be certified as aged, in block form, prior to cutting and shipping, a minimum of 6 weeks by air-drying, or equivalent. Insulating material must 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 must 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 must have a minimum 28-day compressive strength of 4000 psi (281 Kg/cm2). Air content of plastic concrete must be between 4 and 6 percent air by volume. Provide a dosage of air entraining agent, which will produce 19 plus or minus 3 percent air in a 1 to 4 by weight standard sand mortar in accordance ASTM C 185. Provide aggregate in accordance with ASTM C 33. Seal the panel joints with fully loaded and tooled sealant joints that are properly sized, shaped, and placed against manufacturer approved backing material. Sealant material thickness must not be less than 1/4 inch (6mm).

For rain screen precast panel wall systems with back-up wall construction, provide sealed face joints that allow moisture to be drained from the wall cavity behind the precast panels via weeps. Provide flashing and water/ moisture resistant barriers to direct water from the wall cavity to the outside of the building. Locate weeps where cavity is obstructed such as above through-wall flashing, at head and sill flashing above and below windows, above door flashings, and wall base flashing.

For barrier wall precast panel wall systems without back-up wall construction, provide a two stage drained joint system on all precast panels joints. Design the two staged drained joint system to provide the following;

a. Locate all sealant beads on the exterior side of the backer rod. Align placement of the exterior sealant bead with the exterior surface of the precast panel and space the placement of the interior sealant bead as required below but no less than 3 inches (75 mm) from the face of the panel to the face of the interior tooled sealant bead.
b. Space sealant beads as far apart as possible but provide no less than 1 inch (25mm) clear air space between the exterior seal backer rod and the tooled interior sealant bead.
c. Form minimum of 1/2 inch (12mm) weep holes to facilitate drainage in the vertical sealant joints. Attach a bead of sealant to the interior vertical sealant bead with an outward slope and a drop in height of at least 4 inches (100mm) to form the drainage plane for the weep opening.
d. Locate weeps as necessary to allow complete drainage of water from the two stage air/ vent space. Provide weeps at obstructions in the air/ vent space such as through wall flashing, horizontal panel joints, head and sill flashing above and below windows, above door flashing, and wall base flashing.

Minimize cracking potential of precast concrete elements by implementing expansion and control joints in the precast

assembly. Comply with the following;

a. Exposed Aggregates - In addition to the above aggregate, facing mixture aggregate, and aggregate for homogeneous panels with exposed aggregate finish, must be crushed stone.
b. Cement - ASTM C 150.
c. Admixtures - ASTM C 260 for air-entraining admixtures. Other admixtures: ASTM C 494. Certify that admixtures are free of chlorides.
d. Reinforcement - ACI 301.
e. Inserts - ASTM A 47, Grade 32510 or 35018, or may be medium strength cast steel conforming to ASTM A 27/A 27M, Grade U-60-30. Where exposed to moisture, provide inserts hot-dip galvanized after fabrication in accordance with ASTM A 153/A 153M.
f. Embedded Plates - ASTM A 36/A 36.
g. Flashing Reglets - Fabricate of sheet metal, open-type with continuous groove 1-1/8 inches (28 mm) deep minimum by 3/16 inch (5 mm) wide at opening and sloped upward at 45 degrees. Top surface must have toothed lip section to anchor upturned edge of metal snap-lock counter flashing when inserted. Provide stainless steel sheet metal, 0.011 inch (0.28 mm) minimum thickness, ASTM A 167, Type 302 or Type 304, Number 2D finish, soft temper.
h. Clip Angles - ASTM A 36/A 36M steel, galvanized after fabrication in accordance with ASTM A 153/A 153M.
i. Ferrous Casting Clamps - ASTM A 47, Grade 32510 or Grade 35018 malleable iron or cast steel, or ASTM A 27/A 27M, Grade U-60-30, cast steel casting, hot-dip galvanized in accordance with ASTM A 153/A 153M.
j. Threaded Fasteners – Provide galvanized machine bolts, washers and, when required, nuts.

   1) Bolts: ASTM A 449, 3/4 inch (19 mm) diameter machine bolts with hexagon head.

   2) Washers: American National Standards Institute (ANSI) B18.21.1, medium or heavy lock-spring washers.

   3) Nuts: ASTM A 563, Grade C, heavy, hexagon-type nuts.

   4) Square Nuts: ASTM A 563, Grade A, plain.

B201001 1.6 CONCRETE WALL PANEL RESTORATION

Match the materials, physical and chemical properties, and composition of new concrete of the existing concrete to be repaired, unless samples and testing determine that existing mixtures and materials are faulty or non-performing.

B201001 1.6.1 Existing Concrete Testing

Take representative samples of existing concrete from areas of the structure to be repaired at indicated locations. Take samples in accordance with ASTM C 42 and ASTM C 823 and test in

accordance with ASTM C 39, ASTM C 42, ASTM C 295, ASTM C 457, ASTM C 856, ASTM C 1218/C 1218M, and ASTM C 642, ASTM C 114, and ASTM C 1084. Evaluate aggregates in the existing concrete in accordance with ASTM C 136 and ASTM C 295. Determine the air content of the existing concrete in accordance with ASTM C 457 and ASTM C 642.

B201001 1.6.2 Admixtures

Air entraining admixtures must conform to ASTM C 260, water-reducing or -retarding admixtures must conform to ASTM C 494, and pigments for integrally colored concrete must conform to ASTM C 979 and ASTM C 1017. Admixtures must not contain added chlorides.

B201001 1.6.3 Aggregates

Aggregates must conform to ASTM C 33.

B201001 1.6.4 Cement

Match cement composition of cement used in existing concrete to be repaired as determined by samples and testing and conforms to the basic requirements of ASTM C 150, Type I or II. Provide cement with non-shrink (shrinkage compensating) properties and conforms to ASTM C 1107, Class B or C, expansive cement type.

B201001 1.6.5 Pozzolan

Provide pozzolan to conform with ASTM C 618, Class F, including limit on available alkalis, "Table 2 - Supplementary Optional Chemical Requirements," and uniformity requirements, "Table 4 - Supplementary Optional Physical Requirements."

B201001 1.6.6 Epoxy Anchor Adhesives

Use epoxy-resin grout to bond steel anchors to concrete with a 100 percent solids, moisture insensitive, low creep, structural adhesive. The epoxy must conform to ASTM C 881, type IV; grade and class selected to conform to the manufacturer's recommendations for the application. The epoxy adhesive must be conditioned, proportioned, mixed, and applied in accordance with the manufacturer's recommendations, except as otherwise specified herein.

a. Epoxy-resin grout - Provide a two-component material, 100 percent solids by weight, formulated to meet the requirements of ASTM C 881, Type I or II. Use type I material when materials or atmospheric temperatures are 70 degrees F (21 degrees C) or above. Use type II material when materials or atmospheric temperatures are below 70 degrees F (21 degrees C). Provide epoxy-resin grout with the ability to structurally rebond cracks, delaminations, and hollow plane conditions in concrete; must be insensitive to the presence of water; and must have the capability to penetrate cracks down to 5 mils in width.

Materials must have been successfully used in similar conditions for a period of at least five years.

b. Epoxy Injection Ports - Design injection ports for epoxy-resin grout for the intended use as required in this section and made according to the recommendation of the epoxy manufacturer.

B201001 1.7 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. Shop coat all surfaces of wood siding and trim 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.

b. Water resistive barrier - Install to protect back-up wall assembly.

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. Provide a water resistive barrier to protect back-up wall assembly and 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. Comply with manufacturer's requirements for fastener types and nailing process.

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. Provide a water resistive barrier under panel systems and install in accordance with manufacturers recommendations. Panel system must 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. Provide clear colorless glass block. Units to have polyvinyl butyral edge coating. Units to have 75 percent light transmission allowance. 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. Provide DECORA, VUE, or ARGUS pattern for the exterior glass block units. Units designated as "reflective glass block" must have a highly reflective oxide surface coating of a gray color.

B201001 1.10.2 Concrete Unit Masonry

Masonry walls must comply with ACI 530.1. Load-bearing units: ASTM C90, Non-load bearing- units: ASTM C129, Type I or II. Provide ground face units, split-faced units, or split-ribbed units for exposed exterior walls. Provide water repellent admixture to masonry units where the exterior face of the units will not receive a waterproof coating such as paint. Mortar must conform to ASTM C 270, Type S. Test mortar in accordance with ASTM C 780. Provide water repellent admixture and color additive in mortar for masonry walls that will not receive a waterproof coating such as paint. Do not use admixtures containing chlorides. Provide air entrainment, not to exceed 12 percent, in mortar.

a. Adjustable Anchors for Structural Members - Use adjustable anchors to anchor masonry structural steel columns or beams. Weld the fixed portion of the anchors (steel anchor rods) to the structural steel member. Provide adjustable

anchors 3/16 inch (5 mm) diameter steel wire, triangular-shaped. Anchors attached to steel must be 5/16 inch (8 mm) diameter steel bars placed to provide 1/16 inch (1.6 mm) play between flexible anchors and structural steel members.

b. Deformed Bars - ASTM A 615/A 615M, ASTM A 616/A 616M, ASTM A 617/A 617M, or ASTM A 706/A 706M.

B201002 EXTERIOR WALL BACKUP CONSTRUCTION

B201002 1.1 CONCRETE UNIT MASONRY

Provide concrete unit masonry as described in B201001 1.10.2

Provide water resistive barrier on the cavity-facing wythe of the backup masonry. Coordinate water resistant barrier materials and methods to provide water control and vapor transmission control for the lifetime of the structure. Seal all holes and penetrations in the water resistive barrier and repair any material damaged by other construction operations.

B201002 1.2 LOAD-BEARING METAL FRAMING SYSTEM

Deflections of structural members must not exceed the more restrictive of the limitations of International Code Council/International Building Code (ICC/IBC) and UFC 3-301-01, *Architecture*.

a. Studs - ASTM A1003/ASTM A1003M, Structural Grade 50, Type H minimum; provide Z180 (G60) galvanized coating in accordance with ASTM A653/ASTM A653M. Do not expose studs to direct moisture contact. Clearly stamp studs with manufacturer's name, initials, or logo, an ICC number, material thickness and yield strength. Choose size and gage as required to meet the loading requirements specified.

b. Bracing - Provide horizontal bracing in accordance with design calculations and American Iron and Steel Institute (AISI) S100, 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 foot 4 inches (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. Provide one of the following sheathings:

(1) Plywood: C-D Grade, Exposure 1, with an Identification Index of not less than 24/0.

(2) Structural-Use and Oriented Strand Board (OSB) Panels: Sheathing grade with durability equivalent to Exposure 1, Span Rating of 24/0 or greater.

(3) Gypsum: ASTM C79/C 79M and ASTM C1177/C1177M, 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. Face gypsum sheathing with materials capable of resisting six months of weathering exposure without degradation of the covering or the gypsum material. Seal all joints as recommended by the manufacturer.

d. Water resistive barrier – Install to protect back-up wall assembly.

B201002 1.3 WOOD FRAMING SYSTEM

Kiln-dry all lumber materials to comply with DOC PS 20. Install lumber materials in accordance with AF&PA T11. Use preservative pressure treated lumber at sill plates and other members in contact with concrete and masonry surfaces. Preservative pressure treated must be in accordance with American Wood Protection Association (AWPA) Standard U1.

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 must withstand structural loads imposed on the wall structure. Cover sheathing with a water resistive barrier and other barriers as required by the vapor pressure and hygrothermal analysis. Provide one of the following sheathings:

(1) Plywood: C-D Grade, Exposure 1, with an Identification Index of not less than 24/0.

(2) Structural-Use and Oriented Strand Board (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. Face gypsum sheathing with materials capable of resisting six months of weathering exposure without degradation or the covering or the gypsum material. Seal all joints as recommended by the manufacturer.

c. Water resistive barrier – Install to protect back-up wall assembly.

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. Provide concrete construction ccordance with ACI 301.
c. Refer to Performance Verification Testing for Cast-in-place field quality control.
d. Concrete construction tolerances must be in accordance with ACI

117.

e. Design for watertight joints, or weeping joints having back-up water penetration protection in precast elements. Minimize cracking potential of precast concrete elements by implementing expansion and control joints in the precast assembly.

f. Joints must include properly sized and placed backing material and fully loaded and tooled sealant joint of no less than 1/4 inch sealant material thickness.

g. Provide a water resistive barrier to protect back-up wall assembly.

B201003 INSULATION AND VAPOR RETARDER

Provide insulation, air barriers, water resistive barriers, and moisture barrier/ vapor retarders (if required) in the exterior enclosure to control heat loss/gain, air infiltration/diffusion, moisture infiltration/diffusion, and water infiltration.

Provide insulation, air barrier and water resistive barrier on all conditioned facilities and moisture barrier/ vapor retarders when required by the exterior enclosure vapor pressure and hygrothermal analysis. These barrier materials may be installed separately or combined if different air barrier, moisture barrier/ vapor retarder, and water resistive barrier functions can be consolidated in one material.

Provide exterior enclosure barriers that are durable and designed to last the life of the facility. Seal the continuous air and water resistive barrier in a flexible manner to allow for relative movement of adjacent building enclosure components. Support exterior enclosure barriers to withstand maximum positive and negative air pressure to be placed on the building without displacement or damage and transfer the load to the structure. Permanently seal penetrations, joints, holes, and transitions to adjoining construction in air and water resistive barriers as recommended by the material manufacturer. Do not compromise exterior enclosure barrier integrity at electrical boxes, fixture supports, and fasteners with holes through the exterior enclosure barriers that allow air or water leakage. Do not expose exterior enclosure barriers or retarders to environment conditions longer than is recommended by the manufacturer.

B201003 1.1 INSULATION SYSTEMS

Provide vertical and horizontal polystyrene insulation conforming to ASTM C578 or rigid polyisocyanurate board wall insulating products conforming to ASTM C591 or mineral-fiber blanket insulation conforming to ASTM C 665. Wall insulating product must have a minimum R-value as indicated by applicable ASHRAE 90.1 calculations called for in UFC 1-200-02, *High Performance and Sustainable Building Requirements*, and meeting minimum building envelope insulation requirements of UFC 3-101-01 *Architecture* and the energy design of the facility. Seal the joints in rigid insulation within cavity/veneer walls for additional moisture and air infiltration protection.

B201003 1.2 AIR BARRIER

The building air barrier is a combination of various construction materials/ components that form a continuous air barrier seal on all

six sides of a building. Use methods recommended by the manufacturer to seal joints and intersections for air-tightness of materials designated as part of the air barrier. Individual materials used in the continuous air barrier must have an air permeance not to exceed 0.004 cfm/ft2 at a pressure differential of 0.3 inches water (1.56lb/ft2), (0.02 L/s. m2 at 75 Pa) when tested in accordance with ASTM E 2178. If the air barrier is to be field tested, refer to the requirements in the paragraph entitled "Air Barrier Performance Testing" of this section for entire building minimum air permeance. Provide air barrier installation at windows in accordance with ASTM E 2112.

B201003 1.2.1 Exterior Enclosure Air Barrier Materials

Refer to Air Barrier Association of America (ABAA) to identify qualified materials with the appropriate performance for the air barrier. Utilize materials from the "ABAA Evaluated Air Barrier Materials" found at the following web link;

https://www.airbarrier.org/technical-information/evaluated-assemblies-2/

B201003 1.3 WATER RESISTIVE BARRIER

Provide a water resistant barrier to resist bulk water penetration and wind-driven rain that passes the exterior cladding of the facility. Provide vapor permeable water resistant barrier if the water resistive barrier function is combined with other exterior enclosure barrier functions. Integrate water resistive barriers with wall flashing to form a shingled effect and direct water down the outside surface of the water resistive barrier, away from the back-up wall assembly, and out of the wall. Comply with the requirements of ASTM E2256 for mechanical fastened building wrap materials or ICC-ES Acceptance Criteria AC38 for other materials.

B201003 1.3.1 Exterior Enclosure Water Resistive Barrier Materials

Refer to Air Barrier Association of America (ABAA) to identify qualified materials with the appropriate performance for the water resistive barrier. Utilize materials from the "ABAA Evaluated Air Barrier Materials" found at the following web link;

https://www.airbarrier.org/technical-information/evaluated-air-and-water-resistive-barrier-assemblies/

B201003 1.4 MOISTURE BARRIER/ VAPOR RETARDER

Provide a moisture barrier/ vapor retarder to slow or reduce the unintended movement of water vapor in and out of conditioned space, if required by exterior enclosure vapor pressure and hygrothermal analysis. Perform the analysis and provide a moisture barrier/ vapor retarders in accordance with UFC 3-101-01, *Architecture*. Choose the moisture barrier/ vapor retarder permeability as a function of climate, the characteristics of the materials that comprise the assembly, and the interior conditions. Select moisture barrier/ vapor retarders in

accordance with ASTM C755.

B201004 PARAPETS

Avoid parapets when possible, but when necessary, provide parapets with the same materials as the exterior wall construction, including framing members, anchors, flashings, cants, and accessories. Design parapets to withstand the lateral loads prevailing at the project site and be provided with thruwall flashing below the parapet cap, at structural members, at penetrations, and at the roof level. Provide flashing and scuppers in accordance with SMACNA.

B201005 EXTERIOR LOUVERS & SCREENS

If required, provide louvers, which are not an integral part of the mechanical equipment, exterior closures, grilles and screens, storm shutters, and other materials used for a variety of purposes including screening of equipment or as louvers for exterior doors.

Louvers, screens, grilles in must be selected in a color and design that is compatible with the fabric of the exterior architectural character as described below. For frame construction, install in accordance with ASTM E 2112.

B201005 1.1 WALL LOUVERS

Provide drainable blade type wall louvers with blade slopes of 45 degrees minimum, but provide wind driven rain rated louvers for wall louvered rooms without a floor drain within the room. Louvers must withstand a wind load of not less than 30 psf (146 Kg/m2), .08 inch (2 mm) thick 6063-T5 or T52 extruded aluminum in a factory-finished color in accordance with AAMA 2605 with a minimum coating thickness of 1.2 mil to match the building facade. Wall louvers must bear the AMCA certified ratings program seal for air performance and water penetration in accordance with AMCA 500 , 500L (wind driven rain), and AMCA 511. Provide sill flashing with sloped drain pan at base of louver to collect moisture that migrates down the interior face of the louver. This sill flashing must drain water to the outside of the building. Louvers must have bird screens.

B201005 1.2 SCREENED EQUIPMENT ENCLOSURE

Design and fabricate support frames to withstand wind loads. Anchor frames securely in place. Provide secondary horizontal steel or aluminum framing for attachment of screen materials. Screen material must be factory finished coating in accordance with AAMA 2605 with a minimum coating thickness of 1.2 mils. Form metal panels from galvanized steel sheet in accordance with per ASTM A 653 or aluminum sheet in accordance with ASTM B 209.

B201005 1.3 STORM SHUTTERS

B201005 1.3.1 Roll Shutters

Roll shutters must have factory finished 0.050 inch (1.27 mm), 6063-T5/T6 aluminum slats with continuous over-head housing, frame and tracks. Roll shutter must be capable of being locked in

a closed position by a non-key device.

B201005 1.3.2 Accordion Shutters

Accordion shutters must have factory-finished aluminum alloy 6063-T5/T6 slats and tracks. Accordion shutter must 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 must 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 must 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 must 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 must have steel-framed insect screens secured to room side and readily removable. Louvers must 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 must 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 must be in accordance with section B201001 EXTERIOR CLOSURE, paragraph titled, "Face Brick."

B201006 1.2.2 Concrete Masonry Units

Concrete masonry balcony walls must 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 must 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 must 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 steel and aluminum materials in accordance with NAAMM Pipe Railing Systems Manual, with the same size handrail and vertical post. Provide series 300 stainless steel pipe collars. Factory coat all metal railings, except ornamental metals such as brass, bronze, and nickel-silver, with a high performance coating in accordance with AAMA 2605 for aluminum with a minimum coating thickness of 1.2 mils unless otherwise noted. For steel handrails provide finish coating in accordance with UFGS 09 96 00, *High Performance Coatings*.

B201006 1.5.1 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. Steel railings must be of 1 1/2 inches (38 mm) nominal size. Railings must be hot-dip galvanized, shop primed shop painted for exterior applications.

B201006 1.5.2 Aluminum Handrails

Aluminum railing must be of 1-1/2 inch (38 mm) nominal schedule 40 pipe conforming to ASTM B 429 or 1-3/4 inch (44 mm) square aluminum semi-hollow tube with rounded corners conforming to ASTM B 221. Railings must be coated with a high performance coating or anodized in accordance with AAMA 612, Class I. All fasteners must be series 300 stainless steel.

B201006 1.5.3 Wood Handrails

Wood handrails must be of pre-finished natural hardwood in oak, walnut, or ash. Wood must be coated with hard acrylic finish to withstand indentations.

B201006 1.5.4 Fiber Reinforced Plastic (FRP) Handrails

Provide FRP handrails in structural shapes manufactured by the pultrusion process with qualities, quantities, properties, arrangements and dimensions as necessary to meet the design requirements in accordance with ASCE 7,29 Code of Federal Regulations (CFR) 1910.23, National Fire Protection Association (NFPA) 101. Provide integral UV inhibitors within the resin,

synthetic surfacing veil to help produce a resin rich surface, and UV resistant coating for outdoor exposures.

B201007 EXTERIOR SOFFITS

Exterior soffit system assemblies must include trim and necessary accessories including high performance coatings, if required. Installation must be crisp, fit and trim with tight joinery to back-up framing. Design soffits to be field assembled by lapping side edges of adjacent panels and mechanically attaching through panels to galvanized, non-load bearing framing conforming to ASTM A 653 (G60) and ASTM C 645, using concealed fasteners. Provide trim accessories of the same material and finish as the soffit material where soffit abuts other materials.

Use adequate backing material to assure snug joints and even face planes. Where soffits ventilate an attic space, or an otherwise unventilated space, provide a soffit/ridge/louver/ventilator ventilation system with air quantities complying to the IBC. For spaces intentionally not vented, provide sealed soffits to maintain the integrity of the air barrier and insulation barrier.

B201007 1.1 METAL SOFFIT PANELS

Provided metal soffit panels factory-formed and factory-finished. Use factory-applied sealant in side laps

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

Provide exterior gypsum wall board soffit system with a 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 must assure that the gypsum soffit material does not have direct water contact.

B201008 WALL FLASHING

Flashing must be aluminum or stainless steel or copper. Aluminum must conform to ASTM B 209/B 209M, 0.040 inches (1.27 mm) thick and must be coated to match the item flashed. Stainless steel must conform to ASTM A 167, type 302 or 304, 2D finish, fully annealed, dead soft temper. Thickness must be a minimum of 0.018 inches (0.4572 mm). Copper must conform to ASTM B 370, cold rolled temper. Thickness of copper must be 20 ounces per square foot (6.125 Kg/m2). Incorporate the flashing in the water resistive barrier and seal joints to flashing to form a shingled effect and direct liquid water to the exterior of the exterior enclosure and away from back-up wall assembly.

B201009 EXTERIOR PAINTING AND SPECIAL COATINGS

Apply coatings directly to all non-prefinished surfaces of the exterior construction. Comply with Master Painters Institute requirements for surface degradation analysis, surface preparation, paint and coating selection, paint application restrictions for substrate materials, and paint application.

B201009 1.1 GENERAL REQUIREMENTS

Painting practices must comply with applicable federal, state and local laws enacted to insure compliance with Federal Clean Air Standards. Apply coating materials in accordance with Society for Protective Coatings (SSPC) PA 1. SSPC PA 1 methods are applicable to all substrates.

Provide all paint in accordance with the Master Painter Institute (MPI) standards for the exterior architectural surface being finished. The current MPI, "Approved Product List" which lists paint by brand, label, product name and product code as of the date of contract award, will be used to determine compliance with the submittal requirements of this specification. The Contractor may choose to use a more current MPI "Approved Product List"; however, only one list may be used for the entire contract. All coats on a particular substrate, or a paint system, must be from a single manufacturer. No variation from the MPI Approved Products List is acceptable.

Select paint systems for the project in accordance with the MPI Architectural Painting Decision Tree available on the Whole Building Design Guide. Use this interactive MPI Decision Tree website to identify applicable paint system(s) for the project. The MPI Decision Tree identifies paint systems for each interior or exterior coated surface in "Normal" or "Aggressive" environmental conditions and generally lists the applicable paint systems in descending order of performance. The paint system at the top of each substrate list generally indicates the highest performing acceptable coating system.

Choose the "Aggressive" environmental conditions in the MPI Decision Tree for exterior systems that are used in moist humid conditions, abrasive conditions, chemical exposure conditions, or within five miles proximity of the ocean or a body of water. Also use "Aggressive " environmental conditions in interior spaces that are exposed to in moist humid conditions, abrasive conditions, chemical exposure conditions, such as bathrooms, shower rooms, kitchens, chemical storage area, swimming pools, laundry, sanitary areas, commercial kitchens, industrial production areas, and hospital operating rooms provide paint systems that comply with the MPI Decision Tree "Aggressive" environmental conditions.

Comply with the following requirements when determining the appropriate paint or coating system from the MPI Decision Tree:

a. Some of these paint systems are identified with a "NAVFAC Anchor". This "NAVFAC Anchor" indicates the minimum performing system that NAVFAC will accept for that substrate and environmental conditions.

b. When multiple "NAVFAC Anchors" are indicated on a certain

substrate and environmental condition, provide the "NAVFAC Anchor" paint or coating system that is most appropriate for the facility use.

c. If only one MPI Decision Tree choice is available for a certain substrate and environmental condition with no indicated NAVFAC preference, provide that sole option for NAVFAC projects.

d. If the MPI Decision Tree provides multiple choices and no NAVFAC preference is denoted, refer to the Additional RFP Requirements below to determine level of performance.

e. If the MPI Decision Tree does not identify all paint system applicable to the facility, utilize the *MPI Architectural Painting, Exterior Systems Manual* to identify other appropriate paint systems for the project. Utilize the "Premium Grade" systems and comply with all limitations stated in the MPI "Approved Product List" for each paint product. Products having an MPI VOC Range E3 must be given preferential consideration over lower VOC Ranges. Use higher performing paint systems unless the lower performing paint system can be justified based on a lifecycle cost to include surface preparation, application, disposal, environmental impact, and required recoating cycles. Only use paint products that have been tested for MPI'S "DETAILED PERFORMANCE" or "EVALUATED PERFORMANCE ". Do not use products that have only been tested for "INTENDED USE".

f. If an "Aggressive" environmental condition option is not available in the MPI Decision Tree for a certain substrate, use the "Normal" environmental condition option.

g. Refer to the Additional Exterior Paint and Coating System Requirements below for further system requirements.

Paints and coatings must comply with Master Painters Institute Green Performance Standard GPS-1-12 which is available at the following website;
http://www.specifygreen.com/EvrPerf/EnvironmentalPerformance.html .
Choose paints that provide performance, are environmentally friendly, and that conform to EPA or local environmental regulations, whichever requires the lowest VOC content.

B201009 1.1.1 MPI Gloss Levels

Gloss levels must comply with the MPI system of determining gloss as defined in the Evaluation sections of the MPI Manuals. Utilize the performance characteristics of the paint gloss and sheen to categorize paint rather than manufacturers' description of the product. The MPI Gloss Levels are indicated by the notation G1, G2, G3, G4, G5, G6, or G7. Navy only uses MPI Gloss Levels G2, G3, G5, G6.

The MPI Decision Tree indicates a default gloss level for each paint system, however consider the appearance, anticipated conditions, and need for cleaning when establishing the final gloss level for each coated surface of the project. Comply with the following guidance in choosing the appropriate gloss level.

a. Use G2 "Velvet-like" Flat for ceilings, residential walls away from human contact and low traffic areas.

b. Use G3 "Eggshell-like" in high traffic areas for ceilings and walls, when human contact with the wall is limited, and for dark accent colors.

c. Use G5 Semigloss for walls, doors and trim for high durability and clean ability and when a surface is expected to have routine human contact.

d. Use G6 Gloss only in special situations such as for piping identification or special effects.

The MPI gloss and sheen standard values are in accordance with ASTM D523, and are as follows:

Gloss Level Number	**Gloss@60 Degrees**	**Sheen@85 Degrees**
Gloss Level 1 (G1) - Matte or Flat	Max.5 units	Max.10 units
Gloss Level 2 (G2) - "Velvet-like" Flat	Max. 10 units	10-35 units
Gloss Level 3 (G3) - "Eggshell-like"	Max. 10-25 units	10-35 units
Gloss Level 4 (G4) - "Satin-like"	Max. 20-35 units	Min. 35 units
Gloss Level 5 (G5) - Semi-Gloss	35-70 units	
Gloss Level 6 (G6) - Gloss	70-85 units	
Gloss Level 7 (G7) - High Gloss	More than 85 units	

B201009 1.1.2 MPI System Designations and Table Abbreviations

The MPI coating system number description is found in either the *MPI Architectural Painting Specification Manual* or the *Maintenance Repainting Manual* and defined as an exterior system

a. EXT - MPI short-term designation for an exterior coating system on a new surface.
b. REX - the MPI short term designation for an exterior coating system used in repainting projects or over existing coating systems.
c. DSD - the MPI short-term designation for Degree of Surface Degradation as defined in the Assessment sections in the *MPI Maintenance Repainting Manual*. Degree of Surface Degradation designates the MPI Standard for description and

appearance of existing condition of surfaces to be painted. This DSD classification is used to determine the proper surface preparation necessary for painting.

B201009 1.1.3 Surface Preparation

Comply with the "Exterior Surface Preparation" section of the *MPI Architectural Painting Specification Manual,* or the Exterior Surface Preparation" section of the *MPI Maintenance Repainting Manual*. All suggestive language such as "may" or "should" are deleted from the standard and "must" inserted in its place. Suggestive language such as "recommended" or "advisable" is deleted from the standard and "require" or "required" inserted in its place. The results of these wording substitutions change this document to required procedures. For surface preparation, determine a MPI DSD Assessment of each surface and comply with the MPI Surface Preparation Requirements relating to the assessments. Not-withstanding MPI requirements, clean exterior ferrous metal that is exposed to weather conditions (wind, precipitation, solar degradation, and humidity) to a SSPC SP 10 level (near white).

Remove dirt, splinters, loose particles, grease, oil, and other foreign matter and substances deleterious to coating performance as specified for each substrate before application of paint or surface treatments. For existing buildings, use MPI *Maintenance Repainting Manual* to determine the coatings that need to be removed. Remove deteriorated or loose coatings before repainting begins. Remove oil and grease prior to mechanical cleaning. Program cleaning so that dust and other contaminants will not fall on wet, newly painted surfaces. Spot-prime exposed ferrous metals such as nail heads on or in contact with surfaces to be painted with water-thinned paints with a suitable corrosion-inhibitive primer capable of preventing flash rusting and compatible with the coating specified for the adjacent areas.

B201009 1.2 ADDITIONAL EXTERIOR PAINT AND COATING SYSTEM REQUIREMENTS

In addition to the MPI Decision Tree, comply with the following paint system requirements:

B201009 1.2.1 Pavement Coatings

a. EXT 3.2 Concrete Horizontal Surfaces

Normal/ Aggressive Condition; Pigmented;

Provide road and parking lot pavement marking in accordance with UFGS Section 32 17 23, *Pavement Markings*.

b. EXT 10.2 Bituminous Coated Surfaces

Normal/ Aggressive Condition; Pigmented;

Provide road and parking lot pavement marking in accordance with UFGS Section 32 17 23, *Pavement Markings*.

B201009 1.2.2 Hot Metal Surfaces (including smokestacks)

a. EXT 5.2 Hot Metal, Up to 205 degrees C 400 degrees F

Normal/ Aggressive Condition; Pigmented

(1) EXT 5.2A - Heat Resistant Enamel

Primer: Intermediate/ Topcoat:

MPI 21 Surface Preparation and numbers of coats in accordance with manufacturers' instructions.

b. EXT 5.2 Hot Metal (Ferrous), Up to 400 degree C, 750 degree F

Normal/ Aggressive Condition; Pigmented;

(1) 5.2C - Heat resistant - inorganic zinc coating

Primer: Intermediate/ Topcoat:

MPI 19 Surface Preparation and numbers of coats in accordance with manufacturers' instructions.

(2) 5.2B - Heat resistant - aluminum finish enamel

Primer: Intermediate/ Topcoat:

MPI 2 Surface Preparation and numbers of coats in accordance with manufacturers' instructions.

c. EXT 5.2 Hot Metal (Non-Ferrous), Up to 593 degree C, 1100 degree F

Normal/ Aggressive Condition; Pigmented

(1) 5.2D - Heat Resistant Coating

New and existing surfaces cleaned bare to SSPC SP 10/NACE No. 2

Primer: Intermediate/ Topcoat:

MPI 22 Surface Preparation and numbers of coats in accordance with manufacturers' instructions.

B201010 EXTERIOR JOINT SEALANT

Provide sealant joint design, priming, tooling, masking, cleaning and application in accordance with the general requirements of *Sealants: A Professionals' Guide* from the Sealant, Waterproofing & Restoration Institute (SWRI). All sealant must conform to ASTM C 920.

Joints must include proper backing material for sealant support during application, control of sealant depth, and to act as a bond breaker. Use filler boards, backer rods and bond breaker tapes. Provide priming unless specifically not recommended by the sealant manufacturer. Applied sealant

must be tooled. Tooling must not compact sealant too less than the minimum sealant thickness required. Mask adjacent surfaces to control sealant boundaries during sealant application.

B201011 SUN CONTROL DEVICES (EXTERIOR)

Sun control devices must be manufactured devices to provide sun control on exterior windows and storefronts. Provide sun control devices to withstand the wind loads prevailing at the project site.

B201011 1.1 EXTERIOR SUN SCREENS

Exterior sun screens must be of aluminum with 6063-T5/T6 aluminum demountable frame attachment. Screen material must be formed factory finished metal from aluminum sheet in accordance with ASTM B 209. Screen material must be factory finished coating in accordance with AAMA 2605 with a minimum coating thickness of 1.2 mils. Sunscreen must be awning, fin or other type appropriate to the installation.

B201012 SCREEN WALL

Screen walls include attached or unattached walls adjacent to the main building. Screen walls must conform to the applicable portions of Section B201001 EXTERIOR CLOSURE.

B201090 OTHER EXTERIOR WALLS

B2020 EXTERIOR WINDOWS

Provide standard windows in compliance with American National Standards Institute/American Architectural Manufacturers Association/Window and Door Manufacturers Association (ANSI/AAMA/WDMA) 101, Steel Windows Institute (SWI) SWS, UFC 4-010-01, and the design criteria of ASCE 7 for glazed windows to meet the Building Code.

If required, provide windows that meet the requirements of AAMA/WDMA 101/I.S.2. Residential construction must utilize windows that comply with AAMA LC-25 designation unless the wind pressure on the building exceeds 38 psf (185 Kg/m2). Commercial (non-residential) construction must utilize windows that comply with AAMA designation HC-40 (60 psf - 293 Kg/m2) for windows that do not have to meet anti-terrorism requirements, and HC-60 (90 psf - 439 Kg/m2) for commercial windows that are required to meet anti-terrorism requirements, unless the wind pressure or blast pressure on the building exceeds the design pressure for these minimum windows. Determine the wind pressure on the building by converting the ASCE-7 basic wind speed to wind pressure and find the corresponding structural test pressure in the AAMA specific requirements or optional performance tables. If the residential window wind pressure exceeds of 38 psf (185 Kg/m2) or the commercial (non-residential) window wind pressure exceeds 60 psf (293 Kg/m2) or exceeds 90 psf (439 Kg/m2), utilize a higher AAMA designated window complying with the calculated wind pressure. Anti- Terrorism window systems (including connections) must meet the testing requirements of UFC 4-010-01 when tested in accordance with ASTM F1642.

Comply with ASTM E 2112 and with flashing and weather-resistive barrier manufacturers’ recommendations to install windows in framed wall

construction. Comply with window flashing details from BIA for masonry back-up and veneer walls. Engineer and install window cleaning access and anchorage to the exterior wall or roof for facilities over three stories tall without interior window cleaning access from pivoting or tilting sash. Provide anchors in accordance with Occupational Safety and Health Administration (OSHA) standard 29 CFR Section 1910.66.

Windows must be provided with sills on the exterior and stools on the interior of the opening. Sills must be special shape or cut unit masonry or precast concrete in masonry exterior construction and extruded aluminum or aluminum-wrapped wood framing or formed metal in other construction. Positively slope sills away from windows. Window stools must be slate or solid polymer for commercial construction and painted wood for residential construction.

B202001 WINDOWS

Exterior windows must consist of fixed and operable sash used singly and in multiples. Provide operable sash in spaces occupied by people as a minimum. Include operating hardware, non-corroding framed metal screens for operable sash, and security grilles. Provide jamb support for larger windows where recommended by manufacturer. Metal windows with insulating glass must have thermally broken frames and sash. Provide thermally broken windows and window assemblies where separating conditioned and unconditioned spaces. Provide windows and window assemblies that bear an NFRC energy performance label and meet or exceed current EnergyStar requirements.

Provide glazing in exterior windows in accordance with section B202004 EXTERIOR GLAZING.

B202001 1.1 STANDARD WINDOW SYSTEMS

B202001 1.1.1 Steel Windows

Conform to SWI SWS. Solid hot-rolled steel shape welded frames and mullions. Provide chemically cleaned and primed galvanized frames with polysteel powder coat finish. Provide glazing beads, steel frame screens with aluminum mesh at operable sashes, hardware and locks, and glazing. Aluminum screens must comply with ANSI/SMA 1004.

B202001 1.1.2 Aluminum Windows

Conform to ANSI/AAMA/WDMA 101. Factory finish aluminum windows and provide with aluminum frame screens with aluminum mesh at operable sash, hardware and locks, and glazing. Aluminum screens must comply with ANSI/SMA 1004.

Exposed aluminum surfaces must be factory finished with an AA 45 anodic coating or an AAMA organic coating. Provide a minimum of architectural Class II anodized coating or a baked enamel finish conforming to AAMA 2604 for one- or two-family residential dwelling construction. Provide a minimum of architectural Class I anodized coating or a high-performance organic coating conforming to AAMA 2605 for all other construction. AAMA coatings must have a total dry film thickness of 1.2 mils.

B202001 1.1.3 Security Windows

Security windows delay forced entry into the building through the windows. In addition to meeting the requirements of AAMA 101, windows designated "resistance to forced entry" must conform to the requirements of AAMA 1302.

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 must comply with AAMA 303 and ASTM 4726.

B202001 1.1.5 Wood Windows

Wood windows must consist of complete units including sash, glass, frame, weatherstripping, insect screen, and hardware. Window units must meet the requirements of AAMA 101, except maximum air infiltration must 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 must conform to section B202004, EXTERIOR GLAZING. Insect screen must meet ASTM D 3656, Class 2, 18 by 14 mesh, color charcoal. Aluminum screen frames must 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 must meet performance requirements of AAMA 101. Aluminum finish must 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 must meet or exceed 25 psf (122 Kg/m2) acting inward and 25 psf (122 Kg/m2) acting outward. Design system to withstand this as a minimum and comply with design pressure established within the required ASCE 7 Wind Speed Calculations determined by the overall average opening within the project.

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" must be limited to 1/175 of its clear span and for spans greater than 13’-6" deflection must be limited to 1/240 + 1/4" of its clear span, except that maximum deflection of members supporting plaster surfaces must not exceed 1/360 of its span.

c. Air Infiltration - Air leakage through fixed light areas of storefront must not exceed 0.06 cfm per square foot of surface area when tested in accordance with ASTM E283 at differential static pressure of 6.24 psf (33.84 Kg/m2).

d. Water Penetration - When tested in accordance with ASTM E 331, there must be no water penetration at a pressure of 15 psf (73 Kg/m2) of fixed area.

e. Water infiltration No uncontrolled leakage when tested in accordance with ASTM E331 at test pressure of 10 psf (48 Kg/m2) for system standard and capable of performing within the Design Pressure requirements derived from the ASCE 7 requirements.

f. Provide storefront framing and glazing assembly with an overall thermal transmittance value of not more than 0.40 BTU/hr x ft2 x deg F as determined according to NFRC 100. Provide a thermally broken storefront system where storefront occurs between conditioned and unconditioned spaces. A non-structural thermal break system is not acceptable.

B202002 1.1.2 Doors And Frames

Provide doors complete with frames, framing members, subframes, transoms, adjoining sidelights, adjoining window wall, trim, and accessories, as required for a complete installation. Anchors must be stainless steel. Weatherstripping must be Continuous wool pile, silicone treated, or type recommended by door manufacturer. See B203008, EXTERIOR DOOR HARDWARE for hardware requirements.

B202002 1.1.3 Aluminum Alloy for Doors and Frames

ASTM B 221, Alloy 6063-T6 for extrusions. ASTM B 209, alloy and temper best suited for aluminum sheets and strips.

B202002 1.1.4 Fabrication

a. Aluminum Frames: Provide removable glass stops and glazing beads for frames accommodating fixed glass. Use

countersunk stainless steel Phillips screws for exposed fastenings, and space not more than 12 inches (300 mm) o.c. Mill joints in frame members to a hairline fit, reinforce, and secure mechanically.

b. Aluminum Doors: Doors must be medium or wide stile. Doors must be not less than 1-3/4 inches (44 mm) thick. Minimum wall thickness, 0.125 inch (3.175 mm), except beads and trim, 0.050 inch (1.27 mm). Bevel single-acting doors at lock, hinge, and meeting stile edges. Double-acting doors must have rounded edges at hinge stile, lock stile, and meeting stile edges.

c. Finishes: Provide exposed aluminum surfaces with factory finish of anodic coating conforming to AA45, Architectural Class I or an organic coating conforming to AAMA 2605 with a total dry film thickness of not less than 1.2 mils.

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*.

Provide thermally broken curtain wall framing and infill glazing and panels where separating conditioned and unconditioned spaces.

B202003 1.1.1 Source

Provide curtain wall system components 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 must warrant that the design, construction, and materials installed in the system must be free of manufacturer's defects for the life of the installation. The manufacturer must 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 must 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 must be replaced with new units without additional cost to the Government. The Contractor must 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 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" must be limited to 1/175 of its clear span and for spans greater than 13'-6" deflection must be limited to 1/240 + 1/4" of its clear span, except that maximum deflection of members supporting plaster surfaces must not exceed 1/360 of its span.

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 requirements.

4) Air Infiltration - Air leakage through fixed light areas of storefront must not exceed 0.06 cfm per square foot of surface area when tested in accordance with ASTM E283 at differential static pressure of 26.24 psf (30.32 Kg/m2).

b. Delamination: Adhesively bonded metal-faced or glass faced panels must 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 must 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 must 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 must meet the requirements specified herein. Windows must 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 must not exceed 0.4 percent; there must be no glass breakage, and no permanent damage to fasteners, anchors, hardware, or operating devices. Windows must 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 must 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, must 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 must have the required fire resistive rating when tested in accordance with ASTM E 119.

4) Firestopping Materials and Devices: Firestopping material and attachment devices must 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 must 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 must 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 must not exceed 1/360 of the span. No framing member must 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

Design the curtain wall and the components listed below to meet the performance requirements below.

a. Framing Members in Curtain Wall Main Frames and Sash or Ventilator Members: extrusion strength must meet or exceed the physical properties required for minimum ultimate tensile yield strength of 16,000 psi (110 MPa) when tested under AA ASD1, 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 must 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 must have a color anodized NAAMM MFM finish designation AA-M10-C22-A34 and AA-M10-C22-A44, meeting the requirements of AAMA 611.
h. Glass and Glazing:

   1) Conform to paragraph B202004, GLAZING.

   2) Insulating Glass must 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 moisture/ 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 must be single thickness. Panel facing must 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 must be sandwich type, metal faced both sides, and bonded to form stable and composite unit. Nonexposed face must be galvanized steel. Exposed face must 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 must be glass-faced on the side that will be exposed to view. Glass must be spandrel glass with ceramic coating on its non-weathering surface and smooth finish on the exposed surface; backing must be adhesively bonded to non-weathering surface.

b) Adhesively bonded insulated panels must 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 must 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 glazing. Aluminum screens must comply with ANSISMA 1004.

Exposed aluminum surfaces must be factory finished with an AA 45 anodic coating or an AAMA organic coating. Provide a minimum of architectural Class II anodized coating or a baked enamel finish conforming to AAMA 2604 for 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 must 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 is required to provide a glazing warranty for curtain wall glazing written directly to the Government.

Provide warranty for polycarbonate sheet glazing for a period of 5-years against breakage, coating delamination, and yellowing.

Glazing thickness indicated in the following paragraphs is the minimum acceptable thickness. Provide thicker glazing if required by the manufacturer for the given application.

B202004 1.1 GLASS

B202004 1.1.1 Clear Glass

Type I, Class 1 (clear), Quality q4 (A).

B202004 1.1.2 Heat-Absorbing Glass

ASTM 1036, Type I, Class 2 (heat absorbing and light reducing), Quality q3 (select), 1/4 inch (6 mm) thick, with a light transmittance of approximately 45 percent and total solar transmittance of not more than 50 percent for 1/4 inch (6 mm) thickness. Use warm color tint for warm color frames and cool color tints for white and gray frames.

B202004 1.1.3 Wire Glass

Type II, Class 1, Form 1, Quality q8 Mesh m1 or Form 2, Quality q7, Finish f1, Mesh m1, 1/4 inch (6 mm) thick. Conform to NFPA 80. Glass for fire-rated windows must be Underwriters Laboratories (UL) listed and must be rated when tested in accordance with ASTM E 163.

B202004 1.1.4 Laminated Glass

ASTM 1172, fabricated from two pieces of Type I, Class 1, Quality q3 glass laminated together with a clear 0.030 inch (0.75 mm) thick polyvinyl butyral interlayer. The total thickness must be nominally 1/4 inch (6 mm). Laminated glass used for anti-terrorism window assemblies must be a minimum of 1/4 inch (6 mm) thickness.

B202004 1.1.5 Insulating Glass Units

Provide insulated glass using a combination of the interior and exterior glazing materials listed below filled with a thermal resistive gas. The air space must be sized to meet the thermal requirements below but not less than one half inch (12 mm) for non-residential construction and one quarter inch (6 mm) minimum for residential construction.

Provide active solar control glazing by using tinting, maximum thermal resistance, special coatings to meet Energy Star climate zone and window type requirements (including frames), and comply with the performance characteristics below. Provide an active low-emissivity coating on glass surface number 2 (the inside surface of the exterior glass pane).

If the building is located in a heat dominated climate zone, the facility is designed to utilize solar heat gain to augment the HVAC system, and the window overhang design prohibits excessive solar gain; a passive low-emissivity coating may be used to accommodate the design. Design occupied spaces adjoining passive low-emissivity coated glass for comfortable use of the space.

Provide two panes of glass separated by a dehydrated airspace and hermetically sealed. Dimensional tolerances must be as specified in IGMA TR-1200. The units must conform to ASTM E 773 and ASTM E 774, Class A. Provide primary seal, secondary seal, and spacers to eliminate moisture and hydrocarbon vapor transmission into airspace. Warranty insulating glass units against development of material obstruction to vision (such as dust, fogging, or film formation on the inner glass surfaces) caused by failure of the hermetic seal for a 10-year period following acceptance of the work.

The interior glass pane must be one of the following:

1. Typically ASTM C 1036, Type I, Class 1, Quality q4, minimum 1/4 inch (6 mm) thick;
2. ASTM C 1048, Grade B (fully tempered), Style I (uncoated), Type I, Class 1 (transparent), Quality q4, minimum 1/4 inch (6 mm) thick when required by ANSI Z97.1 or possible human impact is anticipated;
3. ASTM C 1172, laminated glass as specified above, when required by antiterrorism requirements and code requirements for windborne debris.

The exterior glass pane must be one of the following:

1. Typically ASTM C 1036, Type I, Class 2 (tinted heat absorbing or reflective), Quality q4, minimum 1/4 inch (6 mm) thick;
2. ASTM C 1048, Grade B (fully tempered), Style I (uncoated), Type I, Class 2 (tinted heat absorbing or reflective), Quality q4, minimum 1/4 inch (6 mm) thick when required by ANSI Z97.1 or possible human impact is anticipated.

Insulating glass performance for active solar control using low-emissivity coatings:

1. Visible Light Transmission, 66% or lower

2. Outdoor Light Reflectance, 11% or greater

3. Solar Heat Gain Coefficient, .36 or lower

4. Winter U-Value, .35 Btu/square foot x hr x degree F or lower for residential construction and .29 Btu/square foot x hr x degree F or lower for all other types of construction.

B202004 1.1.6 Tempered Glass

ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated), Type I, Class 1 (transparent) or 2 (tinted heat absorbing, Quality q3, 1/4 inch (6 mm) thick.

B202004 1.1.7 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 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 must 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 must 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 as burglar resisting. Mar-resistant sheet must 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 must have fragment retention film if antiterrorism protection is required. The film must be polyester, polyethylene terephthalate, or a composite. Fragment retention film must 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 must only occur at the factory of the fragment retention film manufacturer. The film must include an abrasion resistant coating on the surface that does not receive the film adhesive. Fragment retention film must 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 must be supplied with an optically clear weatherable pressure sensitive adhesive. The adhesive must contain ultraviolet inhibitors to protect the film for its required life and must limit ultraviolet transmission to not more than 8 percent of the radiation between 300 and 380 nanometers. The adhesive must not be water activated. A water-soluble detackifier or release liner may be incorporated over the adhesive to facilitate film application. The adhesive must be 90 percent cured within 30 days of installation. Adhesives on film thicknesses of 0.010 inch (0.254 mm) and greater must be a minimum of 0.0008 inch (0.02032 mm) thick.

B202090 OTHER EXTERIOR WINDOWS

B202090 1.1 OPERABLE TRAY PASS WINDOWS

Provide frames and glass channels of heavy type 6063-TS aluminum extrusions with reinforcing as required. Include bullet-resistant glazing and heavy-duty operable pass tray. Unit must have a minimum of architectural Class I anodized coating or a high-performance organic coating conforming to AAMA 2605. AAMA coatings must have a total dry film thickness of 1.2 mils.

B2030 EXTERIOR DOORS

Provide heavy duty insulated exterior steel doors and frames for service access. Door frames must be welded. Corner knockdown door frames are not permitted.

Use heavy-duty overhead holder and closer to protect doors from wind damage.

Provide kickplates on the inside face of all exterior doors.

Weather-protect all exterior doors and related construction with low infiltration weatherstripping and sealants. Provide threshold with offset to stop water penetration while maintaining accessibility compliance.

Conform to the design criteria of ASCE 7.

See section B203008, EXTERIOR DOOR HARDWARE, for door hardware requirements. For all installations, provide a recessed key box (Knox Box) approximately 7 inches x 7 inches (175 mm x 175 mm) with 4-3/4 inches (120 mm) solid steel door at primary exterior entry for storage of keys and access cards accessible by the fire department.

B203001 SOLID DOORS

B203001 1.1 STEEL DOORS

Provide hardware preparation in accordance with American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA) A156.115. Doors must be hung in accordance with ASTM E2112.

B203001 1.1.1 Steel Doors

Steel doors must be American National Standards Institute/Steel Door Institute (ANSI/SDI) 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 must 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/SDI A250.8, Level 3, physical performance Level A, Model [1] [2] [3]
d. Maximum Duty Doors – ANSI/SDI A250.8, Level 4, physical performance Level A, Model [1] [2]

B203001 1.1.2 Residential Insulated Steel Entry Door Systems

Provide insulated steel doors and frames 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), 16 gage (1.5 mm) and 16 gage (1.5 mm) respectively; for paneled door faces, or 16 gage thick (1.5 mm) for solid doors, with vinyl door bottom flashing. Frames must be a minimum 16 gage thick (1.5 mm); with magnetic weatherstripping; nonremovable-pin hinges; thermal-break aluminum threshold. Doors and frames must receive phosphate treatment, rust-inhibitive primer, and baked acrylic enamel finish. Doors must have been tested in accordance with SDI/DOOR A250.4 and must have met the

requirements for Level C. Prepare doors to receive specified hardware. Doors must be 1-3/4 inch (44.5 mm) thick.

B203001 1.1.3 Insulation Cores

Provide insulated cores of type specified, and provide an apparent U-factor of .48 in accordance with SDI 113 and must conform to:

a. Rigid Polyurethane Foam: ASTM C591, Type 1 or 2, foamed-in-place or in board form, with oxygen index of not less than 22 percent when tested in accordance with ASTM D2863; or
b. Rigid Polystyrene Foam Board: ASTM C578, Type I or II; or
c. Mineral board: ASTM C612, Type I.

B203001 1.1.4 Accessories

a. Provide stationary, sight-proof type louvers which comply with SDI 111-C. Use lightproof louvers if function of room requires darkness. Louver frames must be 20-gage steel with louver blades minimum 24 gage.
b. Astragals: For pairs of exterior steel doors that will not have aluminum astragals or removable mullions, provide overlapping steel astragals with the doors.
c. Moldings: Provide moldings around glass of exterior doors and louvers. Provide non-removable moldings on outside of exterior doors. Secure inside moldings to stationary moldings, or provide snap-on moldings. Muntins must interlock at intersections and must be fitted and welded to stationary moldings.

B203001 1.1.5 Standard Steel Frames

ANSI/SDI A250.8. Form frames with welded corners for installation in exterior walls. Form stops and beads of 20 gage steel. Set frames in accordance with ASTM A250.11.

B203001 1.1.6 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 must be factory primed with a rust inhibitive coating as specified in ANSI/SDI A250.8. Factory prime doors on six sides of the door. Manufacturer's primer and field painting must be compatible with finish system in the paragraph "EXTERIOR PAINTING AND SPECIAL COATINGS".

b. Exterior Doors Galvanized Finish – Must be Commercial Quality, Coating Class A, zinc coating in accordance with ASTM A 591 when facility is located further than 300 feet (91 meters) from the ocean. When facility is located within 300 feet (91 meters) of the ocean, provide G60 galvanized coating in accordance with ASTM A 924/A 924M and ASTM A 653/A 653M.

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 must 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 must 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

Provide wood door louvers of the manufacturer's standard designwhich transmit a minimum of 35 percent free air. Louver must be a galvanized coated louvers with insect screens and comply with SDI 111-C, must 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 must be of the same species and color of the face veneer.

B203001 1.2.5 Fabrication

a. Marking - Each door must bear a stamp, brand or other identifying mark indicating quality and construction of the door.
b. Adhesives and Bonds - WDMA I.S. 1-A. Use Type I bond for exterior doors. Adhesive for doors to receive a natural finish must be non-staining.

B203001 1.3 FIBERGLASS REINFORCED PLASTIC (FRP) DOORS

Hardware preparation must be in accordance with ANSI/BHMA A156.115. Doors must be hung in accordance with ASTM E2112.

B203001 1.3.1 FRP Doors

Provide door and frame components including, but not limited to, astragals, cores, faces, stiles, rails, heads, jambs, and internal reinforcement, which are FRP structural shapes manufactured by the pultrusion process. Ensure all structural shapes are composed of fiberglass reinforcement and resin in qualities, quantities, properties, arrangements and dimensions as necessary to meet the design requirements in accordance with ASCE 7, ICC/IBC and dimensions specified.

Ensure fiberglass reinforcements are a combination of continuous roving, continuous strand mat, and surfacing veil in sufficient quantities as needed by the application and/or physical properties required.

Verify resins are of isophthalic polyester with chemical formulation necessary for corrosion resistance, strength and other physical properties as required.

Provide documentation that all pultruded structural shapes are further protected from ultraviolet (UV) attack with:

a. Integral UV inhibitors within the resin.
b. Synthetic surfacing veil to help produce a resin rich surface.

UV resistant coating for outdoor exposures.

B203001 1.3.2 Accessories

a. Louvers must comply with SDI 111-C, must be stationary, sight-proof type. Use lightproof louvers if function of room requires darkness. Louver frames must be 20-gage steel with louver blades minimum 24 gage. Cutouts for door lights and louvers are to be manufactured and not field fabricated. Cutouts are to be totally enclosed by internal pultruded FRP stiles and rails as specified and incorporated into the door subframe with the opening completely fused to both door faces.
b. Astragals: Provide an integral heavy pultruded FRP astragal on the stile edge of the inactive leaf for double doors of the same materials as specified for door stiles and rails.
c. Moldings: Provide moldings around glass of exterior doors and louvers. Provide non-removable moldings on outside of exterior doors. Secure inside moldings to stationary moldings, or provide snap-on moldings. Muntins must interlock at intersections and must be fitted and welded to stationary moldings.

B203001 1.3.3 Standard FRP Frames

Provide FRP Door Frame utilizing a high-modulus pultruded structural FRP shape. Fabricate pultruded frame with a wall

thickness of not less than 5 mm 3/16-inch. Frames are to be one-piece factory constructed with molded stop. Jambs and header to utilize miter corner connections chemically welded with FRP material ground for a visibly smooth frame face. Post and beam or mechanical fastened corners and joints are not acceptable. Provide sizes and shapes as detailed on the approved drawings.

Provide hardware reinforcement connections utilizing a chemical weld with FRP material at required locations. A minimum pull-out force strength of 1,100 lbs per screw is required for all hardware locations.

B203001 1.3.4 Anchors

Provide anchorage devices and fasteners where necessary for fastening fabricated FRP door frame to the adjacent construction-in-place as recommended by the FRP frame manufacturer.

B203001 1.3.5 Finishes

Ensure all finished surfaces of FRP items and fabrications are smooth, resin-rich, free of voids and without dry spots, cracks, and un-reinforced areas. Completely cover all glass fibers with resin to protect against their exposure due to wear or weathering. All stiles, rails, heads, jambs, and internal reinforcement are to be integrally pigmented.

B203002 GLAZED DOORS

B203002 1.1 ALUMINUM GLAZED DOORS

See B202002 STOREFRONTS, paragraph titled, "Doors and Frames."

B203004 OVERHEAD ROLL-UP AND OVERHEAD SECTIONAL DOORS

Refer to RFP PART 3, Chapter 6 for project specific exterior overhead sectional and roll-up doors system requirements. Do not use exterior roll-up doors as an entrance into conditioned spaces.

B203004 1.1 OVERHEAD ROLL-UP DOORS

Provide overhead doors in accordance with Door and Access Systems Manufacturers Association International (DASMA) requirements. Overhead roll-up doors must conform to ANSI/ DASMA 207. Provide overhead roll-up doors with minimum 22 gage thermal insulated slats, however use door weight, pressure, and width to determine if a heavier gauge slat is required. Electric operators must have protected 3-button switches conforming to National Electrical Manufacturers Association (NEMA) MG 1, NEMA ICS 1, and NEMA ICS 2. Galvanize door and sheet metal components in accordance with ASTM A653. Apply painted coat required in RFP Part 3, Chapter 6, over the galvanizing to all components directly exposed to the weather.

B203004 1.2 OVERHEAD SECTIONAL DOORS

Provide overhead doors in accordance with Door and Access Systems

Manufacturers Association International (DASMA) requirements. Overhead sectional doors must conform to ANSI/DASMA 102 Completely close the door opening in the closed position and make the full width and height of the door opening available for use in the open position. Provide a 3 inch (75 mm) track when required by manufacturers standards, or design pressure and forces on the door, or if the door is equal to or greater than 16 feet (4877 mm) high or wide. Design door storage to allow full use of the space around the door for the activities required in the space. Provide a minimum of 16 inches (400 mm) of headroom for 2 inch (50 mm) tracks, 21 inches (525 mm) of headroom for 3 inch (75 mm) tracks, or a high lift type or vertical lift type. If motorized, provide limit switches to automatically stop doors at the fully open and closed positions. Provide readily adjustable limit switch positions.

Doors must remain operable and undamaged after conclusion of tests conducted in accordance with ASTM E 330 using the design wind load. Form steel door sections of hot-dipped galvanized steel not lighter than 16 gage using a flush surface without ribs or grooves. Sections must be not less than 1 3/4 inches (44.50 mm) minimum panel thickness. Provide maximum insulation value to insulate doors as required to meet energy requirements. Cover interior of door sections with steel sheets of not lighter than 24 gauge to completely enclose the insulating material. Provide galvanized steel tracks not lighter than 14 gauge for 2 inch (50 mm) tracks and not lighter than 12 gauge for 3 inch (75 mm) track. Provide a positive locking device and cylinder lock with two keys on manually operated doors. Form aluminum door panels of 0.050 inch (1.3 mm) sheet aluminum and styles and rails of 6063-T6 aluminum. Galvanize door and steel sheet metal components in accordance with ASTM A653.

B203004 1.3 OVERHEAD DOOR FINISH

Finish steel door and components with hot dipped galvanized coating and apply a baked-on primer and topcoat painted finish. If powder coat finish is required in RFP Part 3, Chapter 6, painted system must conform to the following requirements;

a. Outgas Forgiving Primer

b. Film Thickness per ISO 2360 - 2.5-3.5 mils (60-80 Î¼m)

c. Mandrel Bending Test per ASTM D522 - 1/8 inches (3mm)

d. Impact Test per ASTM D2794 - Up to 80 in/lb. Cracking at the perimeter of the concave area

but no cracking pick off

e. Pencil Hardness per ASTM D3363 - 2H minimum.

f. Color Change per ASTM D2244 - â‰¤Î”Îµ 5.0 (Hunter)

g. Gloss Retention per ASTM D523 - >80%

h. Salt Spray Test per ASTM B117 - 3000 hours

B203005 HANGAR DOORS

Use UFGS Section 08 34 16.10, *Horizontal Rolling Steel Doors*, or UFGS Section 08 34 16.20, *Vertical Lift Fabric Doors*, as required by Part 3 of the RFP.

B203006 BLAST RESISTANT DOORS

Provide blast resistant doors as required by Part 3 of the RFP in accordance with UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*.

B203008 EXTERIOR DOOR HARDWARE

Provide the services of an Architectural Hardware Consultant (AHC), Certified Door Consultant (CDC), or an Electrified Hardware Consultant (EHC) to assist the Designer of Record in preparation of the door hardware schedule and product selection. The hardware consultant must sign and seal the door hardware construction submittal. Provide, as far as possible, door hardware of one manufacturer's make. All hardware must be clearly and permanently marked by the manufacturer where it will be visible after installation.

B203008 1.1 HINGES

BHMA A156.1, size to match door size, but in no case less than 4-1/2 x 4-1/2 inches (114 mm x 114 mm), with non-removable pin and anti-friction bearing hinges. Use two hinges for doors 60 inches (1500 mm) or less in height and one additional hinge for each additional 30 inches (750 mm), or fraction thereof, in door height.

B203008 1.2 PIVOTS

BHMA A156.4.

B203008 1.3 LOCKS AND LATCHES

Commercial (all construction except family housing) buildings locks and latches must be BHMA A 156.13, Series 1000, Operational Grade 1, Security Grade 2 for exterior building entrances and other high-use doors not requiring exit devices. Use BHMA A 156.2, Series 4000, Grade 1 for all Commercial buildings locks and latches not using Series 1000 hardware.

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 must be operated simultaneously by rotating inside lever. Locks with mechanical override lock cylinders are not acceptable. Locks must be operated only by a correctly encoded keycard. Use of a newly issued keycard automatically re-keys the lock and voids the previous keycard. The lock must re-lock immediately after outside lever is turned and latch retracted. Locks must have memory that is capable of recording up to 140 entries into each room, identification of the keycard used to access the room, the date and time of entry. Entry information of the lock must be retrievable by a data key that can be inserted into the lock and then taken to the front desk printer to display information. Other components that are required for this system at the front desk are a personal or laptop computer, printer and encoder to program each key.

For exit device locks with card key access, provide mortise type, narrow stile exit devices with 24 volt DC, solenoid option for card key exterior access at aluminum storefront doors. Provide mortise type exit devices with 24 volt DC, solenoid option with alarm and remote exterior access for card key access at insulated hollow metal doors. The alarmed exit device must sound when exiting only.

Provide a card key system capable of accepting a minimum of 12 keycard access levels, security auditing and computer interfacing with existing installations management system. Provide a single point of contact customer service representative accessible by telephone with a 10-digit telephone number without additional dialing hierarchies except that a maximum 4-digit extension is permissible. On-site service must be provided within 3 hours from request within the first 12 months of occupancy. Provide a 5-year parts and labor warranty.

B203008 1.5 EXIT DEVICES

BHMA A 156.3, Grade 1. Provide on exit doors if it is anticipated that more than 50 people may use a particular door in an emergency exit situation. Touch bars must be provided in lieu of conventional crossbars and arms. Use manufacturer's integral touch bars in aluminum storefront doors.

B203008 1.6 EXIT LOCKS WITH ALARM

BHMA A 156.5.

B203008 1.7 CYLINDERS AND CORES

If required, provide cylinders and cores for new locks, including locks provided under other sections of this specification. Cylinders and cores must have seven pin tumblers. Cylinders must be products of one manufacturer, and cores must be the products of one manufacturer. Rim cylinders, mortise cylinders, and knobs of bored locksets must have interchangeable cores, which are removable by special control keys. Stamp each interchangeable core with a key control symbol in a concealed place on the core.

B203008 1.8 KEYING SYSTEM

Provide a master key system for the facility, unless more than one tenant/tenant command must reside in a facility, or a grand master keying system, or great, grand master keying system if multiple tenants or buildings are required. The keying system must be an extension of the existing keying system for additions to existing facilities. The keying system must allow for construction interchangeable cores when subcontractors require keys during construction. If required, provide a key cabinet.

The Contractor must coordinate a keying system meeting. The Contractor's Project Manager, Superintendent, Hardware Subcontractor, Electrical Subcontractor (if keying hardware is electric), Designer of Record, Contracting Officer, Public Works Base Hardware Specialist, and the Using Activity must attend this meeting to establish the keying system for the project. This meeting is intended to identify base limitations, the necessary security, and access control within the facility. The meeting must produce a marked up copy of the floor plan indicating the doors to receive locks and the doors to be keyed together, and any master keying or grand master keying.

B203008 1.9 KEYS

Furnish one file key, one duplicate key and one working key for each key exchange and for each master and grand master keying system.

B203008 1.10 LOCK TRIM

Cast, forged or heavy wrought construction and commercial plain in design.

B203008 1.10.1 Knobs and Roses

Knobs and roses must meet test requirements of BHMA A 156.2 and BHMA A 156.13.

B203008 1.10.2 Lever Handles

Provide lever handles in lieu of knobs as required by DoD Architectural Barriers Act (ABA) Standards. Lever handles must meet the test requirements of BHMA A 156.13 for mortise locks. All lever handles (mortise or cylinder) must be the freewheeling type.

B203008 1.11 DOOR BOLTS

BHMA A 156.16, Grade 1. Provide two flush bolts for each inactive leaf of a pair of doors.

B203008 1.12 CLOSERS

BHMA A 156.4, Series C02000, Grade 1, with PT 4C, 1-1/2 inch piston, heavy duty forged arm, full size case. Provide closers for all exterior doors, fire-rated doors, corridor doors, stairway doors, and secure area doors, for non-residential (commercial) construction, as a minimum.

B203008 1.13 OVERHEAD HOLDERS

BHMA A 156.8, Grade 1. Provide for exterior doors for non-residential (commercial) construction.

B203008 1.14 DOOR PROTECTION PLATES

Kick plates must conform to BHMA A 156.6. Provide kick plates on all doors with closers and all doors leading to corridors or circulation spaces. Provide armor plates on all doors to receive cart traffic. Provide mop plates on all doors in rooms with a mopable floor finish that do not have kick plates.

B203008 1.15 DOOR STOPS AND SILENCERS

BHMA A 156.16. Provide silencers, Type L03011, three per single door and four per double door, for doors in hollow metal frames.

B203008 1.16 THRESHOLDS

BHMA A 156.21. Provide thresholds with offset to stop water infiltration, while maintaining accessibility requirements.

B203008 1.17 WEATHERSTRIPPING

BHMA A 156.22. Air leakage of weatherstripped doors must not exceed 0.5 CFM of air per square foot of door for residential doors, and 1.25 CFM for non-residential doors (unless a more restrictive infiltration level is specified).

B203008 1.18 RAIN DRIPS

For all exterior doors that open to the outside, where the door swing area is not covered by an overhang, provide top and bottom rain drips complying with ANSI R3Y535 as a minimum. Greater weather sealing may be required by the geographic location of the project.

B203008 1.19 FINISHES

Provide one of the following hardware finish systems, and match the interior door hardware:

a. BHMA A156.18. Hardware must have BHMA 630 finish (satin stainless steel), unless specified otherwise. Provide items not manufactured in stainless steel in BHMA 626 finish (satin

chromium plated) over brass or bronze, except surface door closers which must have aluminum paint finish, and except steel hinges which must have BHMA 652 finish (satin chromium plated). Hinges for exterior doors must be stainless steel with BHMA 630 finish or chromium plated brass or bronze with BHMA 626 finish. Exit devices may be provided in BHMA 626 finish in lieu of BHMA 630 finish. Exposed parts of concealed closers must have finish to match lock and door trim. Hardware for aluminum doors must be finished to match the doors.

b. BHMA A156.18. Hardware must have BHMA 612 finish (satin bronze), unless specified otherwise. Surface door closers must have bronze paint finish. Steel hinges must have BHMA 639 finish (satin bronze plated). Exposed parts of concealed closers must have finish to match lock and door trim. Hardware for aluminum doors must be finished to match the doors. Hardware showing on interior of bathrooms, shower rooms, toilet rooms, washrooms, laundry rooms, and kitchens must 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 must be glazed aluminum doors and frames as specified in this section. Controller must 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 must be capable of sensing an individual moving as slow as 2.2 inches (55.8 mm) per foot. The infrared sensors must employ both diffused presence sensors that see through the plane of the door, and distance measuring sensors. The infrared sensors must constantly remain in operation. The safety device must 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 must be fully adjustable with a universal remote control, and meet or exceed the requirements of ANSI A156.10. System must include aluminum guard rails and signage for additional personnel safety.

B203090 1.1.2 Automatic Sliding Entrance Door Controller

Automatic sliding entrance doors must be glazed aluminum doors and frames as specified in this section. Controller must 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 must be capable of sensing an individual moving as slow as 2.2 inches (55.8 mm) per foot. The focused active infrared sensors must overlap their patterns for full coverage of the motion pattern and extend its range all the way to the floor surface. The infrared sensors must constantly remain in operation even when the door is in the closing cycle. Door and frame must have a "break-away" feature that allows the door to be pushed open in an emergency exit situation.

-- End of Section --

SECTION B30

ROOFING
06/23

B30 GENERAL

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

B30 1.1 DESIGN GUIDANCE

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

Industry standards, codes, and Government standards that are referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Federal Facility Criteria (FFC) at the Whole Building Design Guide (WBDG) website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award.

B30 1.1.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s): UFC 3-101-01 Architecture UFC 3-110-03 Roofing)
UFC 1-200-02	High Performance and Sustainable Building Requirements

B30 1.1.2 Design Requirements

Wind Uplift Resistance: Determine the required wind uplift resistance based on American Society of Civil Engineers (ASCE)

ASCE/SEI 7 wind loading calculations or applicable building code requirements and UFC 3-101-01 *Architecture* and UFC 3-110-03 *Roofing*. The specified Factory Mutual (FM) rating incorporates a safety factor of 2 over the maximum calculated uplift pressure. Therefore, a FM rating of 1-90 correlates to a maximum uplift calculation of 2.2 kPa, 45 psf. When a rated system is specified, ensure the specified roof system is capable of meeting the wind uplift resistance specified. Where non-rated systems may be allowed and used, delineate calculated values in the roof specification or drawings. Utilize independently tested and rated roof systems, such as Factory Mutual (FM), Underwriters Laboratory (UL), and Single Ply Roofing Industry (SPRI).

The complete roof system assembly must be rated and installed to resist wind loads calculated in accordance with ASCE/SEI 7 and validated by uplift resistance testing in accordance with Factory Mutual (FM) test procedures. Non-rated systems must not be installed, except as approved by the Contracting Officer. Submit licensed engineer's wind uplift calculations and substantiating data to validate any non-rated roof system.

B30 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory roofing system performance via Performance Verification Testing, and by field inspection as detailed in this section of the RFP. All performance and acceptance testing including final/warranty inspections must be witnessed by the Contracting Officer on all significant roof projects.

A significant roof is defined as a single or group of buildings with greater than 15,000 square feet (1,400 m2) of roof area; or a roof with area that is allocated to energy generating equipment such as solar hot water panels or photovoltaic panels; or where building equipment (excluding HVAC), use, or safety causes multiple roof penetrations.

B30 1.2.1 Pre-Roofing Design Conference

If the project roof meets the definition of a significant roof above, provide a Pre-Roofing Design Conference. Schedule this conference prior to the roof design and roof layout of the facility. Required attendees include the Designer of Record (DOR), Design Quality Control (DQC) Manager, Roof Design Assurance Consultant (if applicable), Commissioning Authority, and Subcontractors directly responsible for installing the roof and equipment that will be mounted on the roof. Discuss and coordinate the following as a minimum:

a. Renewable energy systems to be mounted on the roof and interface with building systems and utilities,
b. Allocation of space on the roof for different functions,
c. Impact of renewable energy systems and building orientation to the suns path,
d. Waterproofing, flashing, and future reroofing considerations of the facility resulting from renewable energy systems inclusion on the roof,
e. Measures taken to eliminate penetration of the roof

membrane. National Roofing Contractors Association (NRCA) roof details proposed for each necessary penetration,

f. Structural requirements to support roof mounted equipment,
g. Aesthetic impact of roof mounted equipment on the facility and measures taken to mitigate negative appearances of equipment.
h. Maintenance and Commissioning requirements of the roof and roof mounted equipment to facilitate final testing and provide proper access and roof membrane protection.

B30 1.2.2 Pre-Roofing Conference

Prior to beginning roofing work, hold a Pre-Roofing Conference with the Contracting Officer. Required attendees include personnel directly responsible for the roofing systems design and construction, DQC Manager, Commissioning Authority, as well as the roofing manufacturer's technical representative, and Roof Design Consultant (if applicable). At this time the Contractor will address any conflicts between the proposed roofing system, the design documents, and the scheduling of work / workers (trades) to assure a watertight roofing installation. Resolutions will be obtained and documented in writing prior to the start of roofing work. A quality assurance/quality control plan must also be established at this time, inclusive of the roofing manufacturer's recommended testing and inspections procedures, and in accordance with industry standard guidelines.

Contractor must provide the following additional information at the pre-roofing conference: Procedure for the roof manufacturer’s technical representative's onsite inspection and acceptance of the roofing substrate, roof insulation, and installation of the roofing in accordance with the roof system warranty, the name of the manufacturer's technical representatives, the frequency of the onsite visits, copies of the roof status reports from the technical representatives to the roof manufacturer, and pertinent structural details to the roofing system.

B30 1.2.3 Roof Design Assurance

If the project roof meets the definition of a significant roof above, the Contractor must utilize the services of a Registered Roof Consultant (RRC) certified by the Roof Consultant Institute, or a Registered Professional Architect or Engineer who specializes in roofing, to approve the roof design. The roof consultant must derive his or her principal income from roofing design on the quality control staff of the Design or Design-Build team. The roof consultant must verify in writing that the design for the project is in accordance with the current edition of NRCA *Roofing and Waterproofing Manual*, UFC 3-110-03, the RFP, and standard industry practices and building codes.

B30 1.2.4 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 will 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 1.2.5 Tests for Surface Dryness

Prior to application of roofing materials, perform surface dryness tests in presence of DOR. Asphalt of 350 to 400 degrees F (177 to 204 degrees C) must not foam upon contact with substrate. After foaming test is performed, test for strippability (adherence).

B30 1.2.6 Quality Control Program

Establish a quality control program to assure adherence to NRCA recommended Quality Control Guidelines for the Application of Roofing Systems and other specified application requirements. Compliance with Part 2 Section 01 45 00, *Quality Control*, is required.

B30 1.3 DESIGN SUBMITTALS

Provide design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine Corps Design Procedures*, UFC 3-101-01, *Architecture* and UFC 3-110-03, *Roofing*.

B30 1.4 CONSTRUCTION SUBMITTALS

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

Test reports, color samples, certificates of conformance, warranties, close out documentation, and manufacturer's instructions for application and installation on all products used on the roof. Products used on the roof consist of but are not limited to structural deck, insulation, membrane or panels, Standing Seam Metal Roofing (SSMR), flashing, fasteners, nailers, accessories and equipment support curbs or equipment support stands for solar equipment, equipment roof plan, maintenance access and paths.

B3010 ROOF COVERINGS

Roof coverings must comply with the requirements of UFC 3-110-03, *Roofing*, and NRCA, *Roofing and Waterproofing Manual* found at http://www.nrca.net/rp/technical/manual/manual.aspx as the primary NAVFAC roofing criteria. Determine wind uplift using wind speed in accordance with ASCE/SEI 7.

Submit the INFORMATION CARD (see "Form 1" at the end of this section) Provide a typewritten card, laminated in plastic and framed in a weather-tight frame, or a photoengraved 0.032-inch (0.81 mm) thick aluminum card for the roof.

This card must be a minimum size of 8 1/2 x 11 inch (216 x 280 mm) and contain information listed in the attached Form 1. Install the card where directed. Furnish framed card and a duplicate card to the Designer of Record.

B301001 STEEP SLOPE ROOF SYSTEMS

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

Install slate roofing systems in accordance with NRCA Standards.

B301001 1.1.1 Warranty

Contractor must 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 must meet the grading standards of the National Slate Association. Field punching of slate must be from the back of the slate.
b. Underlayment Membrane - For standard slate roofs, roofing felts must be un-perforated asphalt-saturated felts, No. 30 or heavier. For graduated slate roofs, two layers of felts must be applied with joints and laps staggered. When roof slopes are less than 4:12, a double layer of felt must be applied in mastic or hot asphalt must 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 must be stainless steel or copper ring shank nails. Nails must be long enough to penetrate the roof sheathing with heads of sufficient diameter to prevent pullover of slate. Slate must hang on the shaft of the fastener, and drawn to, but not tight against the slate surface. Exposed nails on the top courses must 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 must be 16 oz. (454 g) copper or 24 gage stainless steel, and 16 oz. (454 g) lead-coated copper, and must 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

Furnish to the Government the manufacturer's standard lifetime material warranty for the asphalt shingles. The Contractor must 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 must meet ASTM D 3018, Type I, and ASTM D 3462, and must weigh not less than 210 pounds per 100 square feet (95 kg per 9.3 square meters). Shingles must meet the fire resistance requirements of Underwriters Laboratories (UL) 790 for Class 'A' and resist winds in accordance with ASCE/SEI 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 must be a minimum of 0.105 inch (2.7 mm) to a maximum of 0.135 inch (3.4 mm). Nails must be long enough to penetrate through all layers of roofing materials and achieve secure anchorage into a roof deck. A minimum of 4 nails must be used on a full width shingle, and six nails in high wind areas. Location of nails must 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 must 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

Determine underlayment type by slope as follows:

10:12 slope and above must 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 must 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 must be laid shingle fashion with a 19-inch (480 mm) lap.

Tiles are not permitted to 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 must be round-head, sharp point, 11 or 12 gauge, copper or stainless steel ring shank roofing nails. Nail heads must 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 must 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. Use of mortar set tile is not permitted 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 must meet ASTM E 84, with a flame spread of less than 75. When tested in accordance with ASTM E 108, the roof covering system must 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. Determine panel thickness by the requirements of NRCA, *Roofing and Waterproofing Manual*, but not less than 24 gauge for panels less than 16 inches wide (400 mm), and 22 gauge for panels 16 inches (400 mm) wide or greater. All panels greater than 12 inches (300 mm) wide must have preformed reinforcing ribs or embossed for stiffening. The minimum gauge for aluminum panels must be 20-gauge, .032 inch thick (.8 mm thick) or greater. Roofing design must meet deflection and wind load requirements per building code.

The SSMR system covered under this specification must include the entire roofing system; the standing seam metal roof panels, fasteners, connectors, roof securement components, and assemblies tested and approved in accordance with ASTM E 1592. In addition, the system must consist of panel finishes, slip sheet, insulation, vapor retarder, all accessories, components, and trim and all connections with roof panels. This includes roof penetration items such as vents, curbs, skylights; interior or exterior gutters and downspouts; eaves, ridge, hip, valley, rake, gable, wall, or other roof system flashings installed and any other components specified within this contract to provide a weathertight roof system.

a. Provide inverted "L" Standing Seam shape roofing panels.
b. Panel Protection - Treat exposed cut edges with compatible coating comparable to the factory applied coating system for corrosion protection.
c. Sealants - Provide non-curing, non-skinning butyl based sealants and tapes for concealed locations such as within laps and under eaves. Provide polyurethane and curing butyl elastomeric sealants for exposed locations such as along top edge of surface mounted counter flashings.
d. Factory Color Finish - Provide factory applied, baked coating to the exterior and interior of metal wall panels and metal accessories. Provide exterior finish top coat of 70 percent polyvinylidene fluoride resin with not less than 0.8 mil dry film thickness. Provide exterior primer standard with panel manufacturer with not less than 0.8 mil dry film thickness. Interior finish must consist of 0.5 mil dry film thick backer coat if permanently concealed from view by construction or the same coating and dry film thickness as the exterior coating if the panel interior side will be exposed. Provide factory-applied clear 70 percent polyvinylidene fluoride (PVF), 0.8 mil top coat and edge coating on all factory-cut or unfinished panel edges for projects within 300 feet (91 meters) of the ocean or industrial environments.
e. Warranty - Furnish manufacturer's no dollar limit materials and workmanship warranty for the roofing system. The warranty period must not be less than 20 years from the date of Government acceptance of the work. The warranty must be issued directly to the Government. The warranty must provide that if within the warranty period the metal roofing system becomes non-watertight or shows evidence of

corrosion, perforation, peeling paint, rupture or excess weathering due to deterioration of the roofing system resulting from defective materials or workmanship the repair or replacement of the defective materials and correction of the defective workmanship must be the responsibility of the roofing system manufacturer. Repairs that become necessary because of defective materials and workmanship while roofing is under warranty must be performed within 7 days after notification, unless additional time is approved by the Contracting Officer. Failure to perform repairs within the specified period of time will constitute grounds for having the repairs performed by others and the cost billed to the manufacturer. Provide a 2-year contractor installation warranty. Coating must not show a color change greater than 5 NBS color units in accordance with ASTM D2244, and not show chalking in excess of 10 in accordance with ASTM D4214.

f. Wind Uplift - Metal roofing systems must be designed and attached to resist wind uplift pressures calculated in accordance with ASCE/SEI 7. Uplift resistance must be validated by applicable Factory Mutual (FM), Underwriters Laboratories (UL), or ASTM uplift resistance test procedures.

B301001 1.4.2 Metal Roof Design Requirements

Design the SSMR system as a complete system. Roof panels, components, transitions, accessories, and assemblies must be supplied by the same roofing system manufacturer. Provide to the DOR a design analysis signed by a Registered Professional Engineer employed by the SSMR manufacturer. The design analysis must include a list of the design loads, and complete calculations for the roofing system and its components; valley designs, gutter/downspout calculations, screw pullout test results, and indicate how expected thermal movements are accommodated.

B301001 1.4.3 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 must 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 must be in full and firm contact with attachment clips. Where prefinished panels are cut in the field, or where any of the factory applied coverings or coatings are abraded or damaged in handling or installation, they must, after necessary repairs have been made with material of the same color as the weather coating, be approved before being installed. Seal openings through panels. Correct defects or errors in the materials. Replace materials which cannot be corrected in an approved manner with nondefective materials. Provide molded closure strips where necessary to provide weathertight construction. Use shims as required to ensure attachment clip line is true. Use a spacing gage at each row of panels to ensure that panel width is not stretched or shortened. Provide 30-pound layer of asphalt-saturated felt placed perpendicular to roof slope, covered by a slip sheet. Overlap side and end laps 75 mm 3 inches, offset seams in building paper with seams in felt.

Apply roofing panels with the standing seams parallel to the slope of the roof. Provide roofing panels in longest practical lengths from ridge to eaves (top to eaves on shed roofs), with no transverse joints except at the junction of ventilators, curbs, and similar openings. Install flashing to assure positive water drainage away from roof penetrations. Locate panel end laps such that fasteners do not engage supports or otherwise restrain the longitudinal thermal movement of panels. Attach panels to the structure with concealed clips incorporated into panel seams. Clip attachment must allow roof to move independently of the structure, except at fixed points as necessary.

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 must include the entire roofing system; the standing seam metal roof panels, fasteners, connectors, roof securement components, and assemblies tested and approved in accordance with ASTM E 1592. In addition, the system must consist of panel finishes, slip sheet, insulation, vapor retarder, all accessories, components, and trim and all connections with roof panels. This includes roof penetration items such as vents, curbs, skylights; interior or exterior gutters and downspouts; eaves, ridge, hip, valley, rake, gable, wall, or other roof system flashings installed and any other components specified within this contract to provide a weathertight roof system.

B301001 1.5.2 Design Requirements

Design the SSSMR system as a complete system, in accordance with ASCE/SEI 7. Provide a design for framing members and connections not indicated on the drawings. Roof panels, components, transitions, accessories, and assemblies must be supplied by the

same roofing system manufacturer. Provide to the DOR a design analysis signed by a Registered Professional Engineer employed by the SSSMR manufacturer. The design analysis must 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 indicate how expected thermal movements are accommodated.

a. Dead Loads - The dead load is the weight of the SSSMR system. Collateral loads such as sprinklers, mechanical and electrical systems, and ceilings must not be attached to the panels.
b. Concentrated Loads - The panels and anchor clips must be capable of supporting a 300 pound concentrated load. The concentrated load must 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. Use the un-deformed shape of the panel to determine the section properties.
c. Uniform Loads - The panels and concealed anchor clips must be capable of supporting the minimum uniform live load specified in the project program.
d. Roof Snow Loads - The design roof snow loads must be shown on the contract drawings.
e. Wind Loads - The design wind uplift pressure for the roof system must be shown on the contract drawings. The design uplift force for each connection assembly must be the pressure given for the area under consideration, multiplied by the tributary load area of the connection assembly. The safety factor listed below must be applied to the design force and compared against the ultimate capacity. Prying must 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 - Design of new or revised framing members and their connections must in accordance with American Institute of Steel Construction (AISC) 335, American Iron and Steel Institute (AISI) SG-973, or SJI Specs & Tables. Maximum deflection under applied live load, snow, or wind load must not exceed 1/180 of the span length.
g. Roof Panels Design – Deflections must be based on panels being continuous across three or more supports. Deflection must be calculated and measured along the major ribs of the panels.

   1) Design steel panels in accordance with AISI SG-973.

   2) Design aluminum panels in accordance with AA ADM. The panel deflection from concentrated loads must 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. Test the SSSMR 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 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

Warranty the SSSMR system 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 must 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 must consist of panel finishes, slip sheet, insulation, vapor retarder, all accessories, components, and trim and all connections with roof panels. This includes roof penetration items such as vents, curbs, 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. Repair 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 as approved by the DOR. See the attached Contractor's required warranty for issue resolution of warrantable defects. This warranty must warrant and cover the entire cost of repair or replacement, including all material, labor, and related markups. Supplement this warranty with written warranties from the installer and system manufacturer, and submit them along with Contractor's warranty; however, the Contractor will be ultimately responsible for this warranty

2) Manufacturer's Material Warranties

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 must 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 weather tightness warranty.

B301001 1.5.4 Roof Panels

Panels must be steel or aluminum and have a factory color or mill finish. Length of sheets must 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 must extend over three or more supports. Sheets longer than 100 feet may be furnished if approved by the DOR. Width of sheets must provide not more than 24 inches of coverage in place. SSSMR system with roofing panels greater than 12 inches in width must have standing seams rolled during installation by an electrically driven seaming machine.

a. Steel panels

1) Provide zinc-coated steel panels 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 must be 0.023 inch (0.584 mm) thick minimum. Panels must 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 must 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 will 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 must be the same as the tested roofing system.

B301001 1.5.6 Accessories

Flashing, trim, metal closure strips, caps and similar metal accessories must be the manufacturer's standard products. Exposed metal accessories must be finished to match the panels furnished.

B301001 1.5.7 Fasteners

Fasteners for steel roof panels must 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 must be aluminum or corrosion resisting steel. Fasteners for structural connections must provide both tensile and shear ultimate strengths of not less than 750 pounds per fastener. Exposed roof fasteners must be sealed or have sealed washers on the exterior side of the roof to waterproof the fastener penetration. Washer material must be compatible with the roofing; have a minimum diameter of 3/8 inch for structural connections; and gasketed portion of fasteners or washers must be neoprene or other equally durable elastomeric material approximately 1/8 inch thick. Exposed fasteners for factory color finished panels must be factory finished to match the color of the panels.

a. Screws - Screws for attaching anchor devices must not be less than No. 14
b. Bolts - Bolts must not be 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 must not be less than 1/4 inch diameter. Blind (pop) rivets must not be less than 9/32 inch minimum diameter.

B301001 1.5.8 Sub-purlins

Cold formed supporting structural members/sub-purlins must have a minimum thickness of 0.059 inches and a minimum tensile yield strength of 50000 psi. Hot rolled structural members must have a minimum thickness of 0.25 inches and a minimum tensile yield strength of 36000 psi. Sub-purlins must be galvanized or shop painted, as required by the project program.

B301001 1.5.9 Factory Color Finish

Panels must have a factory applied polyvinylidene fluoride finish on the exposed side. The exterior finish must consist of a baked-on topcoat with an appropriate prime coat. The exterior

coating must 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 must consist of the same coating and dry film thickness as the exterior. The exterior color finish must meet the test requirements specified below.

a. Salt Spray test - A sample of the sheets must 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 must 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 must 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 must show no signs of blistering, cracking, creepage or corrosion.

d. Impact Resistance - Factory-painted sheet must 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 must 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 must 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 must 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 must not be less than the R-values shown on the contract drawings. Determine R-values 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 must conform to ASTM C 1289, Type II.

b. Blanket Insulation - Blanket insulation must 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 must have a flame spread - 0, smoke developed - 0, be water resistant and have a compressive strength of 500 psi. Glass mat gypsum roof board must conform to ASTM C 1177/C 1177M.

B301001 1.5.11 Sealant

Sealants must be elastomeric type containing no oil or asphalt. Exposed sealant must be colored to match the applicable building color or clear and must cure to a rubber like consistency. Sealant placed in the roof panel standing seam ribs must 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 must 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 must 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 must be used. A fully compatible polyethylene tape with equal or better water vapor control characteristics than the vapor retarder material must be provided. A cloth industrial duct tape in a utility grade must 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 must 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 must be flexible, one-piece devices molded from weather-resistant EPDM rubber. Rubber boot material must be as recommended by the manufacturer. The boots must 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 must be of structural quality, hot-dipped galvanized or galvanized sheet steel, factory primed and prepared for painting with mitered and welded joints. Provide integral base plates and water diverter crickets. Minimum height of curb must be 8 inches above finish roof. Construct curbs to match roof slope and to provide a level top surface for mounting of equipment. Curb flange(s) must be

constructed to match configuration of roof panels. Coordinate curb size prior to curb fabrication with the mechanical equipment to be supported. Coordinate strength requirements for equipment supports to include all anticipated loads. Flashings must not be rigidly attached to underlying structure.

B301002 LOW SLOPE ROOF SYSTEMS

B301002 1.1 GENERAL REQUIREMENTS

a. Warranty (Except SSMRS) - Furnish the roofing system manufacturer's materials and workmanship warranty for the roofing system. The warranty period must not be less than 20 years from the date the Government acceptance of the work. The warranty must be issued directly to the Government and will not be limited in dollar value. The system warranty must include roofing membrane, insulation, flashings, accessories and attachments.
b. Wind Uplift - The complete roof covering assembly must be rated in accordance with FM P7825, capable of withstanding an uplift pressure as determined by ASCE/SEI 7, and FM 1-49 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 Roofing Materials and Systems Directory (RMSD), or Class I roof deck construction in FM P7825. All components of the system must be UL labeled. Complete roof covering assembly must:

   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 must be of compatible material to roof.
e. Cool Roof - If required in RFP Part 2 or Part 3 comply with UFC 3-110-03, Roofing Chapter 1, Cool Roofs. Cool roof design must follow the requirements in UFC 3-110-03, *Roofing*, Chapter entitled "Cool Roofs".

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) in accordance with 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 must 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 TERPOLYMER (EPDM)

B301002 1.3.1 Materials

a. EPDM Sheet - ASTM D 4637. Ethylene Propylene Diene Monomer (EPDM), reinforced, 90 mil (2.3 mm) thick for fully adhered application. Seams must 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, must 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. 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. All work must follow the NRCA RoofMan guidelines and standards stated within this Section.

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, ASTM D 1668, 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 minimum thickness of 85 mils), ASTM D 6163 with glass fiber reinforcing), Type II, Grade S (weighing 58 lbs./100sf and a minimum thickness of 85 mils), ASTM D 6164 (with polyester reinforcing), Type II, Grade S (weighing 70 lbs./100sf and a minimum 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 minimum thickness of 145 mils), ASTM D 6163 (with glass fiber reinforcing), Type II, Grade G (weighing 90 lbs./100sf, and a minimum thickness of 145 mils), ASTM D 6164 (with polyester reinforcing), Type II, Grade G (weighing 90 lbs./100sf, and a minimum thickness of 145 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 must 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

Coordinate the insulation system with the mechanical design to suit the energy requirements of the facility.

B301003 1.1 MINERAL FIBER BLANKET INSULATION

This paragraph covers the requirements for mineral fiber blanket thermal insulation in attics and above ceilings.

B301003 1.1.1 Products

a. Blanket Insulation - ASTM C 665, Type I, II, or III, as appropriate for the installation, Class A, membrane-faced surface with a flame spread of 25 or less; and a smoke developed rating of 150 or less when tested in accordance with ASTM E 84. Indicate insulation R-values on the design drawings.
b. Blocking – Treated wood, metal, un-faced mineral fiber blankets in accordance with ASTM C665, Type I. Blocking around chimneys and other heat producing devices must be non-combustible and meet the requirements of ASTM E 136.
c. Vapor Retarder - 6 mil (minimum) thick polyethylene sheeting conforming to ASTM D 4397, with a water permeance value of 1 perm or less when tested according with ASTM E 96.

B301003 1.2 ROOF AND DECK INSULATION

This paragraph covers the requirements for insulation materials used below the roofing systems.

B301003 1.2.1 Insulation Types

Roof insulation must have an R-value determined in accordance with UFC 3-101-01 *Architecture*, and American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Standard 90.1 and meet project energy goals and be one or an assembly of a maximum of three of the following materials and compatible with attachment methods for the specified insulation and roof system:

a. Polyisocyanurate Board – ASTM C 1289, with a minimum

compressive strength of 138 kPa (20 psi), unless overlaid with another board with a comparable or greater compressive strength. Use insulation facer as recommended by the roofing material manufacturer. Board size is restricted to 4' by 4' when applied in direct contact with concrete deck.

b. Extruded Polystrene (XPS) Board - ASTM C 578, Type IV or X, and 4' by 4' board size.
c. Composite Boards – ASTM C 984 (Polyisocyanurate-perlite) or ASTM C 1289, Type III, 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. Expanded Perlite Board - ASTM C 728, minimum thickness of 3/4" board, and 4' by 4' board size.

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, 500 psi (2450 kPA), Class A.

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 must 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 must be flat, round or hexagonal steel (not less than 1-3/8"(35 mm) diameter) and 28 gage, or plastic plates (not less than 3 inches (75 mm) in diameter).

Fasteners in lightweight cellular concrete decks must penetrate at least 1 inch (25 mm) but not more than 1-1/2 inches (32 mm) into the deck. Withdrawal resistance from lightweight cellular concrete deck must not be less than 40 lbs.(18 kg) each, or 120 lbs. (54 kg) each in metal deck.

Fasteners in steel decks must be hardened fasteners or screws conforming to FM A/S4470 and listed in FM P7825 for Class I roof deck construction.

Fasteners must be place to withstand an uplift pressure required by the project program in the field of the roof and FM Loss Prevention Data Sheets (LPDS) 1-49 for perimeter component and flashing attachment.

Roofing Nails - Provide corrosion resistant ring shank nails of sufficient length to penetrate a minimum of 1 inch (25 mm) into wood nailers or so as to provide appropriate embedment in substrate below. Fasteners must conform to FM A/S4470, and be placed to withstand an uplift pressure of 90 psf (4.3 kPa) conforming to FM P7825, and FM 1-49 for perimeter fasteners.

B301003 1.2.9 Wood Nailers

Wood nailers must be pressure-preservative-treated in accordance with AWPA M2 Standards, permanently marked or branded, and installed flush with the top of the adjacent insulation board. Separate treated wood nailers from roofing metals with underlayment.

B301003 1.2.9.1 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. Provide flashing and sheet metal in accordance with roof manufacturer’s printed installation instructions and in compliance with NRCA and SMACNA

recommendations.

B301004 1.1.1 Materials

Furnish sheet metal items in minimum 8 to 10 foot (2.44 to 3.05 meter) lengths. Sheet metal items include the following: gutters, including hangers; downspouts; counter-flashings; gravel stops and fascias; cap, valley, stepped, base and eave flashings and related accessories.

a. 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 must 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 must be baked-on factory applied color coating of polyvinylidene fluoride (PVF2) or other equivalent fluorocarbon coating with a minimum thickness of 0.8 to 1.3 mils.
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 must be of the same or compatible metal with the item being fastened. Stainless steel fasteners must be used to fasten dissimilar materials.

B301004 1.1.2 Field Quality Control

Fabrication and installation of sheet metal items must be as follows:

a. Install work with watertight and hairline joints, without waves, warps, buckles, fastening stresses, or distortion, allowing for expansion and contraction.
b. Make surfaces to receive sheet metal plumb and true, clean, even, smooth, dry and free of defects and projections that could affect the application.
c. Provide sheet metal flashing in angles formed where roof decks abut walls, curbs, ventilators, pipes, or other vertical surfaces and wherever indicated and necessary to make the work watertight.
d. Provide prefabricated inside and outside corners at all sheet metal intersection pieces. Minimum leg length must be 12 inches (300 mm), maximum length must be 18 inches (450 mm).
e. Fabricate sheet metal to conform to the contours of

surfaces to which applied.

f. All sheet metal cap flashings must have waterproof membrane underlayment installed behind or below the metal components.

g. Provide conforming sheet metal closures at all flashing termination conditions.

h. Provide fastenings and accessories as required to provide a securely attached, watertight construction. Cleats must be a minimum of one gage heavier than the component to be attached.

i. Where sheet metal components are to be embedded in the roofing system, prime both sides of all metal flanges prior to installation.

B301005 GUTTERS AND DOWNSPOUTS

Provide gutters and downspouts compatible with roofing material and finish. Concealed (interior) gutters and downspouts are prohibited. The primary and secondary drainage systems must be sized in accordance with applicable Plumbing and Building Codes. Finish must be baked-on factory applied color coating of polyvinylidene fluoride (PVF2) or other equivalent fluorocarbon coating with a minimum thickness of 0.8 to 1.3 mils.

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 Occupational Safety and Health Administration (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 must be heavy-duty zinc plated steel with non-

removable pins. Latching mechanism must be zinc-coated steel slam latch with inside and outside levers. Springs must 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 must 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 must 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 must be scrutinized closely to minimize the likelihood of future leaks at these locations.

B301006 1.3.1 Warranty

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 must guarantee, but will not be limited to, the following:

a. Light transmission and color of the panels will 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% in accordance with 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 must be constructed of glass-fiber reinforced polyester or extruded cellular thermoplastic polycarbonate materials. Glass-fiber reinforced panels must conform to ASTM D 3841 and to the requirements of American Architectural Manufacturers Association (AAMA) 1600/I.S.7.

a. Non-Combustible Grid Core - The aluminum I-beams must be 6063-T6 with provisions for mechanical interlocking of muntin-mullion and perimeter to provide full bonding surface to contact the face material. Panels must withstand 1200 degrees F (650 degrees C) for a minimum of one hour without collapse or exterior flaming.
b. Adhesive - The laminate adhesive must meet the following requirements:
   1) Tensile strength of 750 psi-in. in accordance with ASTM

C 297.
2) Shear strength must meet or exceed the following in accordance with 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 in accordance with ASTM D 1037 at room temperature.
c) 250 psi (1724 kPa) under accelerated aging in accordance with ASTM D 1037 at 182 degrees F (83 degrees C).
d) 1400 psi (9653 kPa) after 500-hour Oxygen Bomb in accordance with ASTM D 572.
e) 100 psi (690 kPa) at 182 degrees F (83 degrees C).

c. Panel Construction - Panels must consist of fiberglass faces laminated to an aluminum I-beam grid core and must not deflect more than 1.9 inches (48 mm) at 30 psf (1.44 kPa) in 10 feet (3.048 meters) in accordance with ASTM E 72, without a supporting frame.

B301006 1.3.3 Thermoplastic Polycarbonate Panels

The glazing panels must meet the following requirements:

a. The interior flame spread classification must 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 must be an approved light transmitting panel with a CC1 fire rating classification in accordance with ASTM D 635.
c. Self-ignition must be greater than 1058 degrees F (570 degrees C) in accordance with ASTM D 1929.
d. Fire rated roof assembly translucent panels must be successfully evaluated for fire from exterior exposure in accordance with 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 must be sealed and flashed and anchored in a permanent manner and in a manner to avoid the degradation of the watertight integrity of the roof system. Do not cut or otherwise disturb the roof membrane. Mastic seals in the plane of the roof are unacceptable. Anchor plates set in mastic must be set on roof surface cleaned of aggregate and loose material prior to mastic application.

B301090 1.2 ROOF DRAINS (EXISTING)

Where existing roof drains are to be reused in roof replacement

construction, provide new, compatible flashing materials, a new drain clamping ring and new bolts for anchorage. Reuse of existing clamping ring and bolts is unacceptable.

B301090 1.3 VEGETATED ROOFS

Where vegetated roofs are specified, provide additional technical specification for Government approval. Refer to UFC 3-110-03 and Whole Building Design Guide section titled "Vegetated Roof Covering ".

-- End of Section --

FORMS

ROOFING SYSTEM COMPONENTS

1. Contract Number: _____

2. Building Number and Location: _____

3. NAVFAC Specification Number: _____

4. Deck Type: _____

5. Slope of Deck: _____

6. Insulation Type and Thickness:_____

7. Insulation Manufacturer: _____

8. Vapor Retarder (_____) Yes (_____) No

9. Vapor Retarder Type: _____

10. Roofing Description: _____

    Manufacturer (Name, address, and phone no.): _____

    _____

    Type: _____

    Method of attachment: _____

11. Statement of Compliance or Exception: _____

    _____

    _____

12. Date Roof Completed: _____

13. Warranty Period: _____

14. Roofing Contractor (Name and Address):

    _____

    _____

    _____

15. Prime Contractor (Name and Address):

    _____

_____

_____

Contractor's Signature _____ Date: _____

Inspector's Signature _____ Date: _____

Form page 1

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY FOR STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM

FACILITY DESCRIPTION_____

BUILDING NUMBER:_____

CONTRACT NUMBER:_____

CONTRACTOR

CONTRACTOR:_____

ADDRESS:_____

POINT OF CONTACT:_____

TELEPHONE NUMBER:_____

OWNER

OWNER:_____

ADDRESS:_____

POINT OF CONTACT:_____

TELEPHONE NUMBER:_____

CONSTRUCTION AGENT

CONSTRUCTION AGENT:_____

ADDRESS:_____

POINT OF CONTACT:_____

TELEPHONE NUMBER:_____

Warranty page 1

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY FOR STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM (continued)

THE SSSMR SYSTEM INSTALLED ON THE ABOVE NAMED BUILDING IS WARRANTED BY _____ FOR A PERIOD OF FIVE (5) YEARS AGAINST WORKMANSHIP AND MATERIAL DEFICIENCES, WIND DAMAGE, STRUCTURAL FAILURE, AND LEAKAGE. THE SSSMR SYSTEM COVERED UNDER THIS WARRANTY INCLUDES, BUT IS NOT BE LIMITED TO, THE FOLLOWING: THE ENTIRE ROOFING SYSTEM, MANUFACTURER SUPPLIED FRAMING AND STRUCTURAL MEMBERS, METAL ROOF PANELS, FASTENERS, CONNECTORS, ROOF SECUREMENT COMPONENTS, AND ASSEMBLIES TESTED AND APPROVED IN ACCORDANCE WITH ASTM E 1592. IN ADDITION, THE SYSTEM PANEL FINISHES, SLIP SHEET, INSULATION, VAPOR RETARDER, ALL ACCESSORIES, COMPONENTS, AND TRIM AND ALL CONNECTIONS ARE INCLUDED. THIS INCLUDES ROOF PENETRATION ITEMS SUCH AS VENTS, CURBS, SKYLIGHTS; INTERIOR OR EXTERIOR GUTTERS AND DOWNSPOUTS; EAVES, RIDGE, HIP, VALLEY, RAKE, GABLE, WALL, OR OTHER ROOF SYSTEM FLASHINGS INSTALLED AND ANY OTHER COMPONENTS SPECIFIED WITHIN THIS CONTRACT TO PROVIDE A WEATHERTIGHT ROOF SYSTEM; AND ITEMS SPECIFIED IN OTHER SECTIONS OF THE SPECIFICATIONS THAT ARE PART OF THE SSSMR SYSTEM.

ALL MATERIAL DEFICIENCIES, WIND DAMAGE, STRUCTURAL FAILURE, AND LEAKAGE ASSOCIATED WITH THE SSSMR SYSTEM COVERED UNDER THIS WARRANTY WILL BE REPAIRED AS APPROVED BY THE CONTRACTING OFFICER. THIS WARRANTY COVERS THE ENTIRE COST OF REPAIR OR REPLACEMENT, INCLUDING ALL MATERIAL, LABOR, AND RELATED MARKUPS. THE ABOVE REFERENCED WARRANTY COMMENCED ON THE DATE OF FINAL ACCEPTANCE ON _____ AND WILL REMAIN IN EFFECT FOR STATED DURATION FROM THIS DATE.

SIGNED, DATED, AND NOTARIZED (BY COMPANY PRESIDENT)

_____

(Company President) (Date)

Warranty page 2

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY FOR STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM (continued)

SUPPLEMENT THIS WARRANTY WITH WRITTEN WARRANTIES FROM THE MANUFACTURER AND INSTALLER OF THE SSSMR SYSTEM, AND SUBMIT THEM ALONG WITH THE CONTRACTOR'S WARRANTY. HOWEVER, THE CONTRACTOR WILL BE ULTIMATELY RESPONSIBLE FOR THIS WARRANTY AS OUTLINED IN THE SPECIFICATIONS AND AS INDICATED IN THIS WARRANTY EXAMPLE.

EXCLUSIONS FROM COVERAGE

1. NATURAL DISASTERS, ACTS OF GOD (LIGHTNING, FIRE, EXPLOSIONS, SUSTAINED WIND FORCES IN EXCESS OF THE DESIGN CRITERIA, EARTHQUAKES, AND HAIL).

2. ACTS OF NEGLIGENCE OR ABUSE OR MISUSE BY GOVERNMENT OR OTHER PERSONNEL, INCLUDING ACCIDENTS, VANDALISM, CIVIL DISOBEDIENCE, WAR, OR DAMAGE CAUSED BY FALLING OBJECTS.

3. DAMAGE BY STRUCTURAL FAILURE, SETTLEMENT, MOVEMENT, DISTORTION, WARPAGE, OR DISPLACEMENT OF THE BUILDING STRUCTURE OR ALTERATIONS MADE TO THE BUILDING.

4. CORROSION CAUSED BY EXPOSURE TO CORROSIVE CHEMICALS, ASH OR FUMES GENERATED OR RELEASED INSIDE OR OUTSIDE THE BUILDING FROM CHEMICAL PLANTS, FOUNDRIES, PLATING WORKS, KILNS, FERTILIZER FACTORIES, PAPER PLANTS, AND THE LIKE.

5. FAILURE OF ANY PART OF THE SSSMR SYSTEM DUE TO ACTIONS BY THE OWNER TO INHIBIT FREE DRAINAGE OF WATER FROM THE ROOF AND GUTTERS AND DOWNSPOUTS OR ALLOW PONDING WATER TO COLLECT ON THE ROOF SURFACE.

6. THIS WARRANTY APPLIES TO THE SSSMR SYSTEM. IT DOES NOT INCLUDE ANY CONSEQUENTIAL DAMAGE TO THE BUILDING INTERIOR OR CONTENTS THAT IS COVERED BY THE WARRANTY OF CONSTRUCTION CLAUSE INCLUDED IN THIS CONTRACT.

7. THIS WARRANTY CANNOT BE TRANSFERRED TO ANOTHER OWNER WITHOUT WRITTEN CONSENT OF THE CONTRACTOR; AND THIS WARRANTY AND THE CONTRACT PROVISIONS WILL TAKE PRECEDENCE OVER ANY CONFLICTS WITH STATE STATUTES.

**

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 WILL BE RESPONDED TO WITHIN 48 HOURS OF RECEIPT OF NOTICE, BY TELEPHONE OR IN WRITING, FROM EITHER THE OWNER OR CONTRACTING OFFICER. EMERGENCY REPAIRS TO PREVENT FURTHER ROOF LEAKS WILL BE INITIATED IMMEDIATELY; A WRITTEN PLAN WILL BE SUBMITTED FOR APPROVAL TO REPAIR OR REPLACE THIS SSSMR SYSTEM WITHIN SEVEN (7) CALENDAR DAYS. ACTUAL WORK FOR PERMANENT REPAIRS OR REPLACEMENT WILL BE STARTED WITHIN 30 DAYS AFTER RECEIPT OF NOTICE, AND COMPLETED WITHIN A REASONABLE TIME FRAME. IF THE CONTRACTOR FAILS TO ADEQUATELY RESPOND TO THE WARRANTY PROVISIONS, AS STATED IN THE CONTRACT AND AS CONTAINED HEREIN, THE CONTRACTING OFFICER MAY HAVE THE SSSMR SYSTEM REPAIRED OR REPLACED BY OTHERS AND CHARGE THE COST TO THE CONTRACTOR.

IN THE EVENT THE CONTRACTOR DISPUTES THE EXISTENCE OF A WARRANTABLE DEFECT, THE CONTRACTOR MAY CHALLENGE THE OWNER'S DEMAND FOR REPAIRS OR REPLACEMENT DIRECTED BY THE OWNER OR CONTRACTING OFFICER EITHER BY REQUESTING A CONTRACTING OFFICER'S DECISION UNDER THE CONTRACT DISPUTES ACT, OR BY REQUESTING THAT AN ARBITRATOR RESOLVE THE ISSUE. THE REQUEST FOR AN ARBITRATOR MUST BE MADE WITHIN 48 HOURS OF BEING NOTIFIED OF THE DISPUTED DEFECTS. UPON BEING INVOKED, THE PARTIES WILL, WITHIN TEN (10) DAYS, JOINTLY REQUEST A LIST OF FIVE (5) ARBITRATORS FROM THE FEDERAL MEDIATION AND CONCILIATION SERVICE. THE PARTIES WILL CONFER WITHIN TEN (10) DAYS AFTER RECEIPT OF THE LIST TO SEEK AGREEMENT ON AN ARBITRATOR. IF THE PARTIES CANNOT AGREE ON AN ARBITRATOR, THE CONTRACTING OFFICER AND THE PRESIDENT OF THE CONTRACTOR'S COMPANY WILL STRIKE ONE (1) NAME FROM THE LIST ALTERNATIVELY UNTIL ONE (1) NAME REMAINS. THE REMAINING PERSON WILL BE THE DULY SELECTED ARBITRATOR. THE COSTS OF THE ARBITRATION, INCLUDING THE ARBITRATOR'S FEE AND EXPENSES, COURT REPORTER, COURTROOM OR SITE SELECTED, ETC., WILL BE BORNE EQUALLY BETWEEN THE PARTIES. EITHER PARTY DESIRING A COPY OF THE TRANSCRIPT WILL PAY FOR THE TRANSCRIPT. A HEARING WILL BE HELD AS SOON AS THE PARTIES CAN MUTUALLY AGREE. A WRITTEN ARBITRATOR'S DECISION WILL BE REQUESTED NOT LATER THAN 30 DAYS FOLLOWING THE HEARING. THE DECISION OF THE ARBITRATOR WILL NOT BE BINDING; HOWEVER, IT WILL BE ADMISSIBLE IN ANY SUBSEQUENT APPEAL UNDER THE CONTRACT DISPUTES ACT.

A FRAMED COPY OF THIS WARRANTY WILL BE POSTED IN THE MECHANICAL ROOM OR OTHER APPROVED LOCATION DURING THE ENTIRE WARRANTY PERIOD.

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SECTION C10

INTERIOR CONSTRUCTION
09/22

C10 GENERAL

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

C10 1.1 DESIGN GUIDANCE

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

Industry standards, codes, and Government standards that are referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Federal Facility Criteria (FFC) at the Whole Building Design Guide (WBDG) website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award.

C10 1.1.1 Industry Standards and Codes

Sealant, Waterproofing & Restoration Institute

C10 1.1.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s): UFC 3-101-01, Architecture UFC 3-120-10, Interior Design)
UFC 1-200-02	High Performance and Sustainable Building Requirements

C10 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory interior construction assemblies' performance via Performance Verification Testing, as detailed in this section of the RFP. Provide special tests and special inspections in accordance with Part 2 Section 01 45 00, *Quality Control* at no additional cost to the Government.

C10 1.2.1 Slump and Compressive Strength Tests for Grout

Slump between 8 and 11 inches (200 and 275 mm). Provide minimum grout strength of 2000 PSI in 28 days, as tested in accordance with American Society for Testing and Materials (ASTM) C 1019.

C10 1.2.2 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 must 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

Engage a qualified testing and inspection agency to prepare testing and adhesion reports to test for bond strength. Test bond strength in accordance with ASTM E 736 and be found to meet the requirements in UL's *Fire Resistance Directory* for coating materials.

C10 1.3 DESIGN SUBMITTALS

Provide design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine Corps Design Procedures*, UFC 3-101-01, *Architecture*, and UFC 3-301-01, *Structural Engineering*.

C10 1.4 CONSTRUCTION SUBMITTALS

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

Doors, door hardware, windows and glazing, cabinets and countertops, casework, and fireproofing/firestopping.

All structural elements necessary for construction

C10 1.5 SUSTAINABILITY

Provide products and systems in accordance with Part 2 Section 01 33 29, *Sustainability Requirements and Reporting*.

C1010 PARTITIONS

For general use, metal studs and standard grade GWB, CMU with prime filler coat, or CMU/cast-in-place concrete with GWB or skim coat plaster are acceptable unless stated otherwise in the Project Program. Reinforce points where doorknobs can strike a wall and anchorage points for wall mounted equipment.

Provide control joints and installation techniques as recommended by the manufacturer. See PTS Section C30, *Interior Finishes*, for additional information.

Provide painted GWB with access panels at surfaces furred for HVAC, plumbing and other utility services and controls behind wall surfaces.

Acceptable systems where "IMPACT RESISTANCE" (areas subject to physical abuse or wear) is designated in the project program requirements for impact resistance systems include:

a. CMU/cast-in-place concrete with or without plaster or furred impact resistant GWB or surface applied impact resistant textured acrylic architectural coating system.
b. GWB/metal stud system reinforced for impact resistance with a double layer of gypsum board using at least one layer of impact resistant gypsum board to resist denting and puncturing on the impact surface. If wall is subjected to impact on both sides, both sides of the stud require a double layer of gypsum board. Structural, mechanical, and acoustical design requirements effect the metal stud/gypsum support configuration.

C101001 FIXED PARTITIONS

Provide fixed partitions, 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 must have a minimum Sound Transmission Coefficient (STC) as required by the project program. Construct sound-rated bulkheads above partition assemblies for continuity to the deck above.

C101001 1.1 CAST-IN-PLACE INTERIOR CONCRETE WALLS

Accomplish work in accordance with UFC 1-200-01, *DoD Building Code (General Building Requirements)*, American Concrete Institute (ACI) 117 and 301/301M. Concrete Mix Design must be suitable for the job conditions.

C101001 1.2 MASONRY PARTITIONS

Accomplish work in accordance with ACI 530.1/American Society of Civil Engineers (ASCE) 6/The Masonry Society (TMS) 602 and associated ASTM Standards for concrete masonry wall construction.

C101001 1.2.1 Testing

Determine masonry strength in accordance with ACI 530.1. Where fire-rated assemblies are indicated, provide concrete masonry

units that have been tested in conformance with ASTM E 119. Provide certificate of compliance to the Designer of Record (DOR) that the materials and assemblies meet the fire ratings indicated on the drawings.

C101001 1.2.2 Masonry Units Types

C101001 1.2.2.1 Concrete Masonry Units

Units of modular dimensions and air, water or steam cured. Surfaces of units to be plastered or stuccoed must be sufficiently rough to provide bond and exposed surfaces of units must be smooth and of uniform texture.

a. Hollow Load-Bearing Units: ASTM C 90, Type I or II, made of lightweight or normal weight aggregate.
b. Hollow Non-Load-Bearing Units: ASTM C 129, Type I or II, made with lightweight or normal weight aggregate.
c. Special Shapes: Provide special shapes as necessary to complete the work.
d. Fire-Rated CMU: Products must be tested and approved by United Laboratories (UL) according to testing methods described in ASTM E 119, and listed as 2, 3 or 4-hour fire-rated.

C101001 1.2.2.2 Glazed Structural Clay Tile

Provide glazed tile of Grade S, Type I, conforming to ASTM C 126. Tile for fire-rated walls must 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 in accordance with ASTM C 1019.

C101001 1.2.4 Masonry Accessories

a. Horizontal Joint Reinforcement – Fabricate from cold drawn steel wire, ASTM A 82. Wire must be hot-dipped galvanized after fabrication in accordance with ASTM A 153/ A 153M, Class B-2, 1.5 ounces of zinc per square foot (42.52 g / 0.0929 sq. meter).
b. Anchors and Wall Ties – Provide of stainless steel, ASTM A 167, Type 304, or zinc-coated steel.
c. Reinforcing Bars – ASTM A 615 / A 615M.

C101001 1.3 COLD-FORMED METAL FRAMING

Provide Cold-Formed Metal Framing in accordance with the provisions of UFC 1-200-01, *General Building Requirements*, and the International Building Code (IBC).

C101001 1.3.1 Studs

Galvanized steel, ASTM A 653 / A 653M, SS Grade 50, G60

C101001 1.3.2 Framing Accessories

Fabricate steel-framing accessories of the same material and finish used for framing members, with minimum yield strength of 33,000 psi (230 Mpa). Accessories include, but are not limited to, the following: bracing, bridging, blocking, web stiffeners, end and foundation clips, gusset plates, stud kickers, knee braces, girts, joist hangers, reinforcing and backer plates.

Provide permanent metal-to-metal contact separation from stud to electrical conduits, plumbing pipes, and other internal wall system components, such as electrical wires.

C101001 1.4 METAL SUPPORT ASSEMBLIES

Provide steel materials for metal support systems with galvanized coating in accordance with ASTM A 653/ A 653M, G60; aluminum coating ASTM A 463/ A 463M, T1-25; or a 55% aluminum-zinc coating ASTM A 792.

C101001 1.4.1 Suspended and Furred Ceiling Systems, and Wall Furring

ASTM C 841(for lath); ASTM C 645 (for GWB).

C101001 1.4.2 Non-load-Bearing Wall Framing / Furring

ML/SFA MLF (for lath); ASTM C 645, but not thinner than 0.0179 inch (0.4547 mm) thickness. Provide 0.0329 inch (0.8357 mm) minimum thickness for supporting wall hung items such as cabinetwork, equipment and fixtures and for GWB.

C101001 1.5 ROUGH CARPENTRY

Unless otherwise noted, conceal all rough carpentry from view. All framing and board lumber shall be graded and marked by a recognized association or independent inspection agency. Certification of grade is acceptable in lieu of grade markings. Framing lumber such as studs, plates, caps, bucks and nailers must be of the minimum grade for the application in accordance with the grading rules for the local species of framing and board lumber.

C101001 1.5.1 Moisture Content

Air-dry or kiln dry lumber as follows:

a. Framing lumber and boards – 19% maximum
b. Timbers 5" and thicker – 25% maximum

C101001 1.5.2 Fire-retardant Treatment

Comply with AWPA C20 or AWPA C27.

C101001 1.5.3 Preservative Treated Lumber

Preservative treated lumber must be in accordance with AWPA Standards.

C101001 1.5.4 Structural Lumber

Provide of species and grade as listed in AF&PA 101 that have the following minimum allowable unit stresses: 1050 Fb, 700 Fc with 1,200,000 E (for engineered uses) but not less than required by structural calculations.

C101001 1.5.5 Plywood, Structural

PS-1, PS-2.

a. Plywood (Concealed) - C-D grade, exposure 1 durability classification, span rating of 24/16 or greater.
b. Plywood Shear Walls - Structural I, C-C or C-D grade, and a minimum thickness of 1/2 inch (12.5 mm), but not less than required by structural calculations.

C101002 DEMOUNTABLE PARTITIONS

This paragraph covers unitized/component based demountable walls/partitions and associated work, including tracks and anchoring systems. Requirements and configurations must be in accordance with the project requirements. Majority of the components and hardware must be provided by a single manufacturer and on the manufacturer's current General Services Administration (GSA) pricelist.

C101002 1.1 PERFORMANCE REQUIREMENTS

C101002 1.1.1 Product Construction

Panels and framework must 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 must be cold-formed steel or extruded aluminum and powder coated. Panels must be a minimum of 2-1/4" thick, and must have panels available between 6"-48" with 1/16" minimum with nominal widths and filler panels available. Panels must have no more than a Â¼" reveal between adjacent panels or the use of connectors in the same finish of the skin. Panels must have integrated leveling devices and have a minimum of Â½" adjustability at the ceiling and 1" of adjustability at the floor. Walls must 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 must 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 must 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 must be factory installed. Options may 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 must 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 Acoustical Performance

Sound-rated partition assemblies must have a minimum Sound Transmission Coefficient (STC) as required by the RFP Part 3, Project Program. STC ratings must be laboratory test and documentation must be provided.

C101002 1.1.7 Structural Performance

Panel deflection must not exceed 1/120th of the vertical span when tested in accordance with ASTM E 72.

C101002 1.1.8 Electrical Requirements

Modular power options must be available within solid wall cavities, base areas and frames and must have open accessibility before, during and after installation. Power must be accessible to power and data cabling, disconnection, and reconnection to accommodate wall disassembly and relocation. Power Supply to consist of an 8-wire system with 3,3,2 circuits and 2+1 grounding or a 10-wire system with 4-4-2 circuits and 2+2 grounding with isolated grounding available. Underwriters Laboratories (UL) Listed manufactured wiring system rated for 20amp 120V/208V or 120V/240V. The components must have a permanent label listing manufacturer, catalog number, CSA/UL listing. Component's wiring must not be "de populated" to impede future configurations. Electrical system must be capable of working with other manufacturer's products. Light switch and outlet devices must be provided by the manufacturer and be fully pre-wired and pre-installed at the factory. Cables must have a J-Box option for hardwiring any manufacturer's furniture power feed cable. Receptacles to indicate which circuit within the modular wiring zone to which they are connected. Receptacles may/may-not be pre-dedicated but must be able to easily be switched to suit the user circuit requirements. Additional power and/or data modules & hardwired outlets (e.g., fire, safety, thermostats) must have the option of being installed on any panel.

C101002 1.1.9 Installation

To include all materials, labor, equipment, and additional seismic bracing as necessary, needed for a turn-key installation. Existing Walls, ceilings, ceiling suspension systems, or floors must not be altered or damaged to accommodate function of partitions. Manufacturer or manufacturer's representative must take field measurements prior to fabrication.

C101002 1.1.10 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 must 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 – American Iron and Steel Institute (AISI) SG-673.
c. Wire mesh – Provide carbon steel wire with woven diamond mesh and intermediate crimping. Wire must 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 must provide a sound barrier equal to, or greater than, the sound rating of the partition.

C101003 1.1 PERFORMANCE REQUIREMENTS

The retractable partitions below must meet the following performance requirements.

C101003 1.1.1 Burning Characteristics

The system must 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 must have a minimum Sound Transmission Coefficient (STC) as required by the project program. Construct sound-rated bulkheads above partition assemblies for continuity to the deck above.

C101003 1.1.4 Electrical Requirements

Electrically powered partitions must be controlled by electrical switches located in the room where the partitions are stored. Electrical outlets must 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 must be factory finished, supported from an overhead track without floor guides, and complete with hardware, track, and accessories necessary for operation.

a. Suspension System - must 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 must have an integral ceiling guard. Trolleys must 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 – must 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 must have an integral ceiling guard. Trolleys must 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 must have a minimum radius of 18 inches.

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 must 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 must 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 in accordance with 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 International Building Code (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 must be a complete factory assembled unit with or without glass installed. Fabrication of window units must comply with American Architectural Manufacturers Association (AAMA) 101.

a. Fixed Windows - Type F, LC25 for residential, or HC40 for non-residential (commercial).
b. Sliding Glass Pass Windows - Frames and glass channels must be of heavy type 6063-TS aluminum extrusions. Provide 1/4-inch (6.35 mm) clear tempered glass.
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 must consist of complete units, including sash, glass, frame and hardware. Window units must meet the Grade 40 requirements of AAMA 101. Wood members that will receive a transparent finish must 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 must be fixed or operable, as stated in the project program.

2) Material and Color - Window (PVC) color must be a consistent color all the way through the material.

c. Hollow Metal Vision Panels – must meet the requirements of hollow metal frames, paragraph C102001.

C101005 1.3 BULLET RESISTANT WINDOWS

Windows must meet UL Classification, Rating Level 1 through 8, as required for the installation and stated in the project program. Each window must 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 in accordance with manufacturers recommendations.

C101007 INTERIOR GLAZING

ASTM C 1036, unless specified otherwise. Provide patterned glass where required to obscure view into bathrooms and dressing rooms.

Provide setting and sealing materials, stops and gaskets as recommended by the glass or acrylic sheet manufacturer.

Glazing thickness indicated in the following paragraphs is the minimum acceptable thickness. Provide thicker glazing if required by the code or the manufacturer for the given application.

C101007 1.1 GLASS

C101007 1.1.1 Clear Glass

Type I, class I (clear), quality q4 or q5 for patterned glass.

C101007 1.1.2 Wire Glass

Provide glazing of Type II, Class I, Form I, Quality q8 mesh stainless steel, diamond pattern, 1/4 inch (6.35 mm) thick. Glass must comply with ASTM E 163.

C101007 1.1.3 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 must be nominally 1/4 inch (6.35 mm).

C101007 1.1.5 Bullet-Resistant Glass

Provide bullet resistant composite glazing panel listed by UL 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

American National Standards Institute (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 must 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 must be in accordance with the general requirements of *Sealants: A Professionals' Guide* from the Sealant, Waterproofing & Restoration Institute. Refer to manufacturers' recommendations for chemical resistance.

C101008 1.1 JOINT SEALANT TYPES FOR INTERIOR WORK

Sealants must be paintable, and must match the color of adjacent surfaces.

a. Vertical Surfaces - ASTM C 920, Type M, Grade NS, Class 25, Use NT.
b. Horizontal Surfaces - ASTM C 920, ASTM D 1190 for traffic surfaces, Type M, Class 25, Use T.
c. 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

Provide door hardware 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 must be in accordance with Steel Door Institute (SDI) 17, American National Standards Institute/Door and Hardware Institute (ANSI/DHI) A115 and ANSI/SDI 100. Doors must be hung in accordance with ANSI/SDI 100.

C102001 1.1.1 Standard Steel Doors

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 must not exceed 3/4 inch (19 mm).

C102001 1.1.2 Sound Insulated Doors and Frames

Provide sound insulated door and frame assemblies into rooms requiring wall assemblies to be sound insulated with a Sound Transmission Class (STC) rating as required.

C102001 1.1.3 Accessories

a. Shelves for Dutch doors must comply with SDI 111-B, and be of steel not lighter than 16 gage.
b. Provide stationary, sight-proof type louvers which comply with SDI 111-C. Use lightproof louvers if function of room requires darkness. Louver frames must be 20-gage steel with louver blades minimum 24 gage.

C102001 1.2 STANDARD STEEL FRAMES

ANSI A 250.8. Form frames with welded corners for installation in masonry partitions and knock-down field assembled corners for installation in metal stud and GWB partitions. Set frames in accordance with SDI 105. Form stops and beads with 20-gauge steel.

Provide a minimum of three jamb anchors and base steel anchors per

frame, zinc-coated or painted with rust-inhibitive paint, not lighter the 18 gauge. Secure frames to previously installed concrete or masonry with expansion bolts in accordance with SDI 11-F. Provide mortar infill of frames in masonry walls, 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 must be factory primed with a rust inhibitive coating as specified in ANSI A 250.8. Factory prime doors on six sides of the door.
b. Zinc-Iron Alloy Coating (Galvanealed) and Factory Primed Finish
c. Fabricate interior doors and frames (for installation in such rooms as kitchens, laboratories, battery charging, utility rooms and humid areas such as shower/drying areas, areas with frequent floor mopping, or corrosive chemical atmospheres) from zinc coated steel, alloyed type, complying with ASTM A 653/ A 653M. Factory prime doors and frames as specified in ANSI A 250.8.
d. Manufacturer’s primer must be compatible with door finish system in C30, Interior Coatings.

C102001 1.4 WOOD DOORS

C102001 1.4.1 Wood Doors 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 must be solid wood doors with wood core and solid wood edge bands. Vertical edge bands must be one piece or laminated two-piece solid lumber to match face veneer species for natural finish wood doors. Reinforce door at all hardware attachments to door with sound grade hardwood. Horizontal edge bands must be solid wood or structural composite lumber.

a. Stile and Rail Doors Provide premium or select grade Ponderosa pine, Douglas Fir, White Pine, or Yellow Poplar stile and rail doors conforming to Window and Door Manufacturers Association (WDMA) I.S.6A-01. Doors must be premium grade, heavy duty or as required by the project program.
b. Interior Flush Doors - Flush doors must conform to WDMA I.S.6A-01. Doors must be premium grade, heavy duty, or otherwise as required by the project program.

Provide WDMA I.S. 1A-04 SCLC-5 structural composite lumber core, or staved lumber core, 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 must 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 must be hinged or sliding.

d. Acoustical Doors and Frames - WDMA I.S 1-A-2004 WDMA I.S.6A-01. Doors must 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 must comply with SDI 111-C. Louver frames must be 20-gage steel with louver blades minimum 24 gage.

b. Door Light Openings - Provide glazed openings with the manufacturer's standard wood moldings. Moldings for doors to receive a natural finish must be of the same species and color of the face veneer.

C102001 1.4.3 Fabrication

a. Marking - Each door must bear a stamp, brand or other identifying mark indicating quality and construction of the door.

b. Adhesives and Bonds - WDMA I.S. 1-A. Use Type I (water-proof) adhesive for assembly of interior doors and for the fabrication of stiles, rails, crossbands, and veneers. Adhesive for doors to receive a natural finish must be non-staining. Type II (water resistant) is allowed for fabrication of core parts.

C102001 1.4.4 Finishes

Unless required otherwise by the project program, typically provide natural finish wood doors. Factory prime and or seal on all six sides of doors.

a. Factory Finish - Provide doors finished at the factory as follows: Architectural Woodwork Institute (AWI) Quality Standards Section 1500, specification for Conversion varnish, alkyd urea catalyzed polyurethane, or acrylated UV curable epoxy. The coating must be AWI Quality Standards premium, medium rubbed sheen, with an open or closed grain effect. Poly-wrap prefinished wood doors at factory for shipping.

b. Field Finish - Prepare doors in accordance with WDMA I.S.1-A-2004. Factory prime or seal doors. Manufacturer's primer or sealer must be compatible with door finish system in Section C30, *Interior Finishes*.

c. Plastic Laminate Finish - Factory applied, National

Electrical Manufacturers Association (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 must obtain hairline fit, be reinforced, and mechanically secured.

C102002 1.2.2 Aluminum Doors

Doors must not be less than 1-3/4 inches (44 mm) thick, with a minimum wall thickness of 0.125 inch (3.2 mm), except beads and trim, 0.050 inch (1.27 mm). Full glazed stile and rail doors must have medium or wide stiles and rails. Maximum water leakage of the door and frame must be "no uncontrolled water penetrating systems or appearing on systems' normally exposed interior surfaces from sources other than condensation." Water controlled by flashing and gutters that is drained to exterior and cannot damage adjacent materials or finishes is not considered water leakage.

C102002 1.2.3 Welding and Fastening

Locate welds and fasteners on unexposed surfaces, where possible. Exposed welds must be dressed smoothly. Exposed fasteners must have counter-sunk heads. Weld concealed reinforcements for hardware in place. Hardware reinforcements must be of stainless steel or steel with a hot-dipped galvanized finish, and must be secured with stainless steel screws.

C102002 1.2.4 Finishes

Provide exposed aluminum surfaces with factory finish of anodic or organic coating. Anodic coatings must conform to AA 45, with an Architectural Class I finish, 0.7 mil or thicker. Organic coatings must be a baked enamel finish in accordance with AAMA 2605 with a total dry film thickness not less than 1.2 mil. Exposed fasteners to match the door finish.

C102003 FIRE DOORS

This paragraph covers all interior fire doors, including all necessary frames, hardware, closing devices, and alarms associated with the door.

C102003 1.1 FIRE AND SMOKE DOORS AND FRAMES

Provide in conformance with National Fire Protection Association (NFPA) 80 an NFPA 105. Fire doors and frames must bear the label of UL, Factory Mutual (FM) or WHI attesting to the rating required. Door and frame assemblies must be tested for conformance with NFPA 252 or UL 10C (for positive pressure). Wood fire doors must also comply with ASTM E 152.

Provide stainless steel astragals complying with NFPA 80 for fire-rated assemblies and NFPA 105 for smoke control assemblies.

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 must be sliding or bi-folding, as required by the program.

C102005 INTERIOR OVERHEAD DOORS

Refer to RFP PART 4, B20 Exterior Enclosure - "Overhead Roll-Up and Overhead Sectional Doors" for interior overhead door requirements. Design for ASCE 7 wind loading not required for interior overhead doors.

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 must sign and seal the door hardware construction submittal. Provide, as far as feasible, locks, hinges, pivots, and closers from one lock, hinge, pivot, or closer manufacturer's make. All door hardware must be clearly and permanently marked by the manufacturer, on a location to be visible after installation. Modify hardware as necessary to provide features indicated or specified. For necessary hardware items not indicated in these specification sections, provide American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA) grade 1 rated hardware.

C102007 1.1.1 Hardware for Fire Doors

All hardware provided must meet the requirements of NFPA 80 for Fire Doors and NFPA 101 for exit doors. Hardware must bear the label of Underwriter's Laboratories, Inc., and be listed in UL

BMD or labeled and listed by another testing laboratory acceptable to the contracting officer. Comply with NFPA 105 for smoke control assemblies.

C102007 1.1.2 Hinges

BHMA A156.1, Grade 1, 4-1/2 x 4-1/2 inches (108 x 108 mm) with non-removable pin or anti-friction bearing hinges.

C102007 1.1.3 Locks and Latches

For non-residential buildings use Series 1000, Operational Grade 1, Security Grade 2 for stairways, building entrances, corridors, assembly spaces, and other high use interior doors. Use Series 4000, Grade 1 for non-residential locations not using Series 1000 hardware. 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 must be fitted with a GSA-approved pedestrian door deadbolt meeting Federal Specification FF-L-2740 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. 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 must have a full complement 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 must generate its own electrical energy with each turn of the dial, with no batteries or wires required. Lock must 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 must be operated simultaneously by rotating inside lever. Locks with mechanical override lock cylinders are not acceptable. Locks must be operated only by a correctly encoded keycard. Use of a newly issued keycard automatically re-keys the lock and voids the previous keycard. The lock must re-lock immediately after outside lever is turned and latch retracted. Locks must have memory that is capable of recording up to 140 entries into each room, identification of the keycard used to access the room, the date and time of entry. Entry information of the lock must be retrievable by a data key that can be inserted into the lock and then taken to the front desk printer to display information. Other components that are required for this system at the front desk are a personal or laptop computer, printer and encoder to program each key.

For exit device locks with card key access, provide mortise type, narrow stile exit devices with 24-volt DC, solenoid option for card key exterior access at aluminum storefront doors. Provide mortise type exit devices with 24-volt DC, solenoid option with alarm and remote exterior access for card key access at insulated hollow metal doors. The alarmed exit device must sound when exiting only.

System must be capable of accepting a minimum of 12 keycard access levels, security auditing and computer interfacing with the existing or new management system. Provide a single point of contact customer service representative accessible by telephone with a 10-digit telephone number without additional dialing hierarchies except that a maximum 4-digit extension is permissible. On-site service must be provided within 3 hours from request within the first 12 months of occupancy. Provide a 5-year parts and labor warranty.

C102007 1.1.6 Exit Devices

BHMA A 156.3, Grade 1. Provide touch bars in lieu of conventional crossbars and arms. Use manufacturer's integral touch bars in aluminum storefront doors.

C102007 1.1.7 Cylinders and Cores

Provide cylinders and cores for new locks, including locks provided under other sections of this specification. Cylinders and cores must have seven pin tumblers. Cylinders must be products of one manufacturer, and cores must be the products of one manufacturer. Rim cylinders, mortise cylinders, and knobs of bored locksets must have interchangeable cores, which are removable by special control keys. Stamp each interchangeable core with a key control symbol in a concealed place on the core.

C102007 1.1.8 Keying System

Provide a master key system for the facility unless more than one tenant/tenant command resides in a facility. Provide a grand master keying system, or great, grand master keying system if multiple tenants or multiple buildings are required. Provide an extension of the existing keying system for existing facility additions. Name the manufacturer of the existing locks, and indicate if they have interchangeable cores. Provide construction interchangeable cores when subcontractors require keys during construction.

Coordinate a keying system meeting. The Contractor's Project Manager, Superintendent, Hardware Subcontractor, Electrical Subcontractor (if keying hardware is electric), Designer of Record, Contracting Officer, Public Works Base Hardware Specialist, and the Using Activity must attend this meeting to establish the keying system for the project. This meeting is intended to identify base limitations, the necessary security, and access control within the facility. The meeting must produce a marked up copy of the floor plan indicating the doors to receive locks and the doors to be keyed together, and any master keying or grand master keying

C102007 1.1.9 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 must meet test requirements of BHMA A 156.2 and BHMA A 156.13.
b. Lever Handles - Provide lever handles in lieu of knobs, as required by DoD Architectural Barriers Act (ABA) Standards. All lever handles must have the freewheeling feature.

C102007 1.1.12 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 must have BHMA 630 finish (satin stainless steel), unless specified otherwise. Provide items not manufactured in stainless steel in BHMA 626 finish (satin chromium plated) over brass or bronze, except surface door closers which must have aluminum paint finish, and except steel hinges which must have BHMA 652 finish (satin chromium plated). Hinges for exterior doors must be stainless steel with BHMA 630 finish or chromium plated brass or bronze with BHMA 626 finish. Exit devices may be provided in BHMA 626 finish in lieu of BHMA 630 finish except where BHMA 630 is specified under paragraph entitled "Hardware Sets". Exposed parts of concealed closers must have finish to match lock and door trim. Hardware for aluminum doors must be finished to match the doors.

b. BHMA A156.18. Hardware must have BHMA 612 finish (satin bronze), unless specified otherwise. Surface door closers must have bronze paint finish. Steel hinges must have BHMA 639 finish (satin bronze plated). Exposed parts of concealed closers must have finish to match lock and door trim. Hardware for aluminum doors must be finished to

match the doors. Hardware showing on interior of bathrooms, shower rooms, toilet rooms, washrooms, laundry rooms, and kitchens must 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 must have an inserted material to match adjacent wall surface. Size access doors large enough to allow convenient hand and tool access and operation of controls and equipment beyond the door. If maintenance of controls or equipment beyond the door requires removal, size access door to allow removal and reinstallation of new equipment through the access door. Provide access panels capable of receiving finish material inserts in visible wall locations of habitable spaces.

C102091 OTHER INTERIOR PERSONNEL DOORS

Interior personnel doors not described by the assembly categories listed above.

C1030 SPECIALTIES

C103001 COMPARTMENTS, CUBICLES AND TOILET PARTITIONS

This paragraph covers assemblies for individual compartments, cubicles, toilet partitions and urinal screens.

C103001 1.1 TOILET PARTITIONS

FS A-A-60003. Provide toilet compartments at multi-fixture toilet rooms of Type I, Style B-Ceiling Hung, C-Overhead Braced, or F-Overhead braced-alcove. Reinforce panels to receive partition-mounted accessories. Steel and Plastic toilet partitions must have a recovered materials content of 20 to 30 percent.

C103001 1.2 URINAL SCREENS

FS A-A-60003. Type III, Style A, floor supported and wall hung or Style D, wall hung. Wall hung urinal screens must be secured with continuous flanges to urinal screen and wall.

C103001 1.3 HARDWARE AND FITTINGS

Chrome-plated or stainless steel door latches and coat hooks. Provide one coat hook per compartment door. Latches and hinges for handicapped compartments must comply with DoD ABA Standards.

C103001 1.4 FINISHES

Finishes must comply with FS A-A-60003. Use only one type of partition per building.

a. Metal toilet partitions and urinal screens must be made of stainless steel.
b. Solid plastic partitions (HDPE) must be fabricated of polymer resins (polyethylene) formed under high pressure forming a single component section one inch thick. Color must extend throughout the panel thickness.
c. Phenolic core panels.
d. Laminated plastic partitions are acceptable in low or limited use applications (one or two toilet stalls per toilet room).

C103002 TOILET AND BATH ACCESSORIES

This paragraph covers toilet and bath accessories including, but not limited to, soap dispensers, paper holders, towel receptacles, grab bars, and bathroom mirrors.

C103002 1.1 TOILET AND BATH ACCESSORIES

C103002 1.1.1 Toilet Tissue Dispensers

Provide surface or recessed mounted dispensers fabricated of stainless steel. Provide one horizontally or vertically mounted double-roll dispenser per toilet compartment, unless otherwise indicated.

C103002 1.1.2 Paper Towel Dispensers

Provide one per pair of sinks in toilet rooms without electric hand dryers, and one per room with electric hand dryers, unless otherwise indicated. Provide surface or recessed mounted towel dispenser constructed of a minimum 0.7mm 0.03 inch Type 304 stainless steel.

C103002 1.1.3 Combination Paper Towel Dispenser / Waste Receptacle

Provide a recessed or semi-recessed type with a capacity of 400 sheets of C-fold, single-fold, or quarter-fold towel and be constructed of 22-gage stainless steel. Provide one per pair of sinks, unless otherwise indicated. Provide the towel compartment door with a tumbler key lock locking mechanism.

C103002 1.1.4 Sanitary Napkin Disposal Units

Units must be toilet partition or wall mounted of not less than 22 gage stainless steel, with top and bottom hinged access doors. Provide one in each Woman's toilet stall, unless otherwise indicated. Each unit must have leak-proof receptacle for disposable liners. Provide fifty disposable liners of the type standard with the manufacturer.

C103002 1.1.5 Medicine Cabinets

Provide units with plate or float glass mirrors on doors. Provide doors and frames of 16-gage steel with a continuous piano hinge and flush magnetic latch.

C103002 1.1.6 Towel Bars

Provide stainless steel towel bars with a minimum thickness of 0.015 inch (0.4 mm).

C103002 1.1.7 Grab Bars

Provide stainless steel grab bars in accordance wtih DoD ABA Standards.

C103002 1.1.8 Robe Hooks

Provide stainless steel two-hook shape with integral wall flange, with a projection not less than 1-5/8 inches (41 mm).

C103002 1.1.9 Mirrors

Provide one manufactured framed electro-copper plated mirror per sink, or one full-size mirror for all sinks, unless otherwise indicated.

C103002 1.1.10 Soap Dispensers

Provide one soap dispenser per two sinks, with mechanical action dispensing valve. Do not mount soap dispenser on mirror. Surface mounted liquid type must consist of a vertical Type 304 stainless steel tank with holding capacity of 1.2L (40 fluid ounces) with a corrosion-resistant all-purpose valve.

C103002 1.1.11 Electric Hand Dryer

Provide wall mount and electric hand dryer designed to operate at 110/125 volts, 60 cycles, single phase alternating current with a heating element core rating of a maximum 2100 watts. Provide dryer housing of single piece construction and of chrome plated steel. Provide one unit per three sinks, unless otherwise indicated.

C103003 MARKER BOARDS AND TACK BOARDS

This paragraph covers all marker boards, tack boards and fastening devices.

C103003 1.1 MATERIALS

a. Porcelain Enamel - Marker board writing surface must be composed of porcelain enamel fused to a nominal 28 gage thick steel sheet, laminated to a 1/4-inch (6.35 mm) thick core material with a steel or foil backing sheet.
b. Cork must be a continuous resilient sheet made from soft, clean, granulated cork, relatively free from hardback and dust and bonded with a binder suitable for the intended purpose. The cork

sheet must have a tensile strength of not less than 40 PSI (275.8 kPa) when tested in accordance with ASTM F 152.

c. Tack-board Covers - Provide woven fabric or vinyl wall covering over cork tack surface.
d. Aluminum - Aluminum frame extrusions must be alloy 6063-T5 or 6063-T6, conform to ASTM B 221, and be a minimum of 0.06 inches (1.5 mm) thick.
e. Hardwood - Exposed hardwood for frames, cabinets and cases must 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 must 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 must 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 must 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 must be aluminum, powder-coated steel, oak, walnut or mahogany.
b. Tack Board - Tack boards must 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, must have an oak or aluminum frame, and be vinyl or fabric covered. Covers must 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 must consist of three primary elements; a structural rail (with coordinating rail joiners to increase sign height in the field), removable copy inserts, and interlocking end caps or frame, and trim.

C103004 1.1.1 Inserts

The signage rails must be designed as to accept ABS plastic signage inserts.

C103004 1.1.1.1 Insert Fabrication

The insert is the signage member to which message signage copy in the form of letters, numbers, and symbols must be applied, and must be interchangeable with similar sized rails of any other sign of equal or greater width and

height. The ends of the rail and insert assembly must be enclosed by end caps of prefinished 6064T5 extruded aluminum. Inserts must be fabricated from 0.090 minimum ultra-violet resistant thickness extruded ABS Acrylic sheet core with 20.003 polycarbonate non-glare clear cap bonded to the core during the extrusion texturing process.

C103004 1.1.2 End Caps

End caps must be injection-molded ABS plastic with integral color. The end caps must be interchangeable to either end of each sign type, and any other similar sign of equal height. The end caps must be interlocking mechanically with the inserts, and rail, requiring no tools for assembly. End caps must utilize straight corners (instead of radius corners). Spring clips must be steel. Plastic spring clips are not acceptable.

C103004 1.1.3 Trim

Optional accessory top and bottom trim frames of prefinished (color as indicated) 6063T5 extruded aluminum must be provided to the signage types indicated.

C103004 1.1.4 Mounting

Mounting of the modular signage system must include surface mounting with screw-on applications for interior and exterior walls and on selected doors as indicated, at the locations indicated, and other mounting devices as indicated.

C103004 1.1.5 Graphics Application

a. Tactile Letters and Symbols

Chemically weld tactile letters and symbols to front surface of signage inserts where indicated and where required by DoD ABA Standards. Tactile letters and symbols must be sized as indicated.

b. Braille

Grade II Braille. Provide Grad II Braille inlaid strip as indicated to match sign color.

C103004 1.2 ALUMINUM ALLOY PRODUCTS

Provide ASTM B 209 for aluminum sheet or plate, ASTM B 221 for aluminum extrusions and ASTM B 26/B 26M or ASTM B 108 for aluminum castings. Provide aluminum extrusions at least 1/8-inch (3.2 mm) thick and aluminum plate or sheet at least 16 gage thick. Provide aluminum castings of solid aluminum cast certified by AA 46 alloy designation B443.0. Where anodic coatings are specified, alloy must conform to Aluminum Association’s alloy designation 514.0 or A514.0.

C103004 1.2.1 Aluminum Finishes

Provide exposed aluminum finishes with either mill finish,

factory finished with anodic coating or organic coating. Anodized finishes must conform to AA 45, Architectural Class I or II, with a coating thickness 0.7 mil or thicker. Organic coatings must be a baked enamel finish with a dry film thickness not less than 1.2 mils, conforming to AAMA 605.2.

C103004 1.3 STEEL PRODUCTS

Provide ASTM A 36/A 36M for structural steel, ASTM A 167 for sheet and plates.

C103004 1.4 CAST METAL

a. Cast Aluminum, ASTM B 108
b. Cast Bronze, ASTM B 62

C103004 1.5 GLASS

ASTM C 1036, Type 1, Class 1, Quality q3

C103004 1.6 FIBER-REINFORCED POLYESTER (FRP)

ASTM D 3841, Type II, Grade 1

C103004 1.7 ACRYLIC SHEET

ASTM D 4802, Type III

C103004 1.8 POLYCARBONATE SHEET

SAE AMS 3611

C103004 1.9 EXTERIOR POST AND PANEL SIGNS

C103004 1.9.1 Posts and Panels

Provide one-piece extruded aluminum posts with not less than 0.125 inch (3.2 mm) wall thickness. Posts must permit attachment of panel framing system. Provide cap for each post. Panel framing system must consist of aluminum extrusions and interlocking track components designed to interlock with concealed fasteners. Panels must be fabricated of rectangular extruded tubular aluminum with a minimum wall thickness of 0.125 inches. Panels must be removable and interchangeable. Posts must be embedded in solid concrete foundation.

C103004 1.9.2 Illumination

Provide concealed lighting within panel framing members. Provide T-12 slim-line lamps,. Ballast must be integrally mounted with high power factor and rated for use in up to minus 20 degrees F (minus 29 degrees C) ambient starting temperature.

C103005 LOCKERS

C103005 1.1 STEEL CLOTHING LOCKERS

C103005 1.1.1 FS AA-L-00486 (Rev J), enameled steel.

Provide ventilated, Single Tier Units (unless multi-tier permitted by Project Program), fully framed. Provide galvanized or galvaneal shelves and bottoms for all lockers, and fully galvanized or galvaneal lockers in locker spaces adjoining shower rooms. Provide full height door stiffeners.

C103006 SHELVING

Assemblies include all types of shelving with brackets and all supporting materials and finish, if required.

C103007 FIRE EXTINGUISHER CABINETS

Cabinet must be constructed of 16 gauge cold-rolled steel door panel / front, and a 22 gauge cold-rolled steel tub. Cabinet must be fire-rated if located in a fire rated wall assembly, and have a full-length piano hinge, and baked enamel finish. Provide a stainless steel cabinet door if cabinet is exposed to the environment. Size and locate fire extinguisher cabinets to encase extinguisher as required by NFPA 10 & 101.

C103008 COUNTERS

C103008 1.1 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 must be constructed to meet "Custom" quality grade as defined in AWI Quality Standards.
b. Finish must 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 must consist of 100% pure acrylic polymer, mineral fillers, and pigments. The material must be homogenous, not coated or laminated. Superficial damage to a depth of 0.010 inch (.254 mm) must be repairable by sanding or polishing. Install with factory recommended fasteners/adhesives/sealant. Provide the following performance characteristics:

a. Tensile strength, ASTM D 638: 5800 psi minimum
b. Hardness, ASTM D 2583: Barcol Impressor 55 minimum
c. Flammability, ASTM E 84: Class I/A, flame spread 25 maximum; smoke developed 30 maximum
d. Thermal Expansion, ASTM D 696:.00002 in/in/F maximum
e. Boiling water resistance, NEMA LD 3: No effect
f. High temperature resistance, NEMA LD 3: No effect
g. Liquid absorption, ASTM D 570 (24 hours): 0.10 percent maximum

h. Mold and mildew growth, ASTM G 21: No growth, no effect
i. Bacteria growth, ASTM G 22: No growth, no effect
j. Sanitation, NSF 51: "Food Contact" approval for food area applications
k. Impact resistance, NEMA LD 3 (1/2 lb. ball drop): 1/4 inch material, 36 inch drop, no failure 1/2 inch material, 120 inch drop, no failure

C103009 CABINETS

This paragraph includes casework items that are permanently fixed in-place. Included are all cabinetry and millwork items with their associated accessories and anchoring devices.

C103009 1.1 WALL AND BASE CABINETS

Wall and base cabinets must be of the same construction and appearance, with solid ends and frame fronts, or with frames all around. Frames must not be less than 3/4 inch by 1 1/2 inches (19 mm by 38 mm) hardwood. All ends, bottoms, backs, and partitions must be hardwood plywood. Cabinet doors and drawer fronts must be a minimum 3/4 inch (19 mm) of either plywood or medium density fiberboard cores with solid edge bands.

C103009 1.1.1 Quality Standards

Wall and base cabinets must be constructed to meet "Custom" quality grade as defined in AWI Quality Standards, except where this specification exceeds AWI Custom.

C103009 1.1.2 Hardware

Provide cabinet hardware including two self-closing hinges for each door and two side-mounted metal drawer slides for each drawer and pulls for all doors and drawers as follows. All cabinet hardware exposed to view must be ANSI/BHMA 156.9, Grade 1, and comply with the following requirements:

a. Concealed Euro-Style, back mounted hinges with opening to 165 degrees and a self-closing feature at less than 90 degrees.
b. Drawer slides must have a static rating capacity of 100 lbs. (444 N).
c. Provide adjustable shelving standards with shelf support hardware for wall cabinets.
d. Provide heavy-duty magnetic latch and door and drawer catch

C103009 1.1.3 Finish

Provide plastic laminate (NEMA LD3) or transparent finish with sealer and varnish as selected by Designer of Record.

C103010 CASEWORK

This paragraph includes all built-in premanufactured metal cabinetry for specialized functions. Provide metal cabinetry for medical, dental,

veterinary and medical research laboratories in accordance with Military Standard (MIL-STD) 1691. Facilities such as libraries and laboratories other than medical, dental, veterinary and medical research laboratories, at a minimum, all casework must conform to the following charts:

	U. S. Standard Thickness GAUGE	(MILLIMETER)
Drawer fronts, backs, bodies, closure plates or scribe and filler strips less than 75 mm wide, filler strips less than 75 mm wide, sloping top, shelf reinforcement channel and shelves. Toe space or casework soffits and ceilings and ceilings under sloping tops.	20	0.89
Base pedestals, casework top sides, back, and bottom panels, closure scribe and filler strips 75 mm or more. Reinforcement for drawers with locks. Table legs, spreaders and stretchers, when fabricated of cold rolled tubing. Metal for desks; except legs and aprons. Door exterior and interior panels, flush or glazed. Cross rails of base units. Front bottom rails, back bottom rails; rails may be 1.49 mm 16 gauge thick. Uprights or posts. Top corner gussets.	18	1.20
Aprons, apron division, reinforcing gussets, table legs, desk legs and aprons, spreaders and stretchers when formed without welding. Toe base gussets, drawer slides, and other metal work. Front top rails and back	16	1.49

rails except top back rails may be 1.2 mm 18 gauge thick. reinforcing gussets, table legs, desk legs and aprons, spreaders and stretchers when formed without welding. Toe base gussets, drawer slides, and other metal work. Front top rails and back rails except top back rails may be 1.2 mm 18 gauge thick.		
Drawer runners door tracks	14	1.88
	U. S. Standard Thickness GAUGE	(MILLIMETER)
Base unit bottom corner gussets and leg sockets	12	2.64
Reinforcement for hinge reinforcement inside doors and cabinets	11	3
	U. S. Standard Thickness GAUGE	(INCH)
Drawer fronts, backs, bodies, closure plates or scribe and filler strips less than 75 mm wide, filler strips less than 75 mm wide, sloping top, shelf reinforcement channel and shelves. Toe space or casework soffits and ceilings and ceilings under sloping tops.	20	0.035
Base pedestals, casework top sides, back, and bottom panels, closure scribe and filler strips 75 mm or more. Reinforcement for drawers with locks. Table legs, spreaders and stretchers, when fabricated of cold rolled tubing. Metal for desks; except legs	18	0.047

and aprons. Door exterior and interior panels, flush or glazed. Cross rails of base units. Front bottom rails, back bottom rails; rails may be 1.49 mm 16 gauge thick. Uprights or posts. Top corner gussets.		
	U. S. Standard Thickness GAUGE	(INCH)
Aprons, apron division, reinforcing gussets, table legs, desk legs and aprons, spreaders and stretchers when formed without welding. Toe base gussets, drawer slides, and other metal work. Front top rails and back rails except top back rails may be 1.2 mm 18 gauge thick reinforcing gussets, table legs, desk legs and aprons, spreaders and stretchers when formed without welding. Toe base gussets, drawer slides, and other metal work. Front top rails and back rails except top back rails may be 1.2 mm 18 gauge thick.	16	0.059
Drawer runners door tracks	14	1.88
Base unit bottom corner gussets and leg sockets	12	0.104
Reinforcement for hinge reinforcement inside doors and cabinets	12	3

C103011 CLOSETS

This paragraph includes all built-in closets with associated work and finishes.

C103012 FIRESTOPPING PENETRATIONS

This paragraph covers fire-stopping assemblies to include sleeves, caulking and flashing. See PTS Section D40, *Fire Protection*, for additional requirements.

C103012 1.1 FIRESTOPPING

Provide firestopping materials, supplied from a single domestic manufacturer, consisting of commercially manufactured, asbestos-free, nontoxic products that are FM Approval Guide approved, or UL listed, for use with applicable construction and penetrating items, complying with the following minimum requirements.

C103012 1.1.1 Fire Hazard Classification

Material must have a flame spread of 25 or less, and a smoke developed rating of 50 or less, when tested in accordance with ASTM E84 or UL 723. Material must be an approved firestopping material as listed in UL Fire Resistance Directory or by a nationally recognized testing laboratory.

C103012 1.1.2 Toxicity

Material must be nontoxic and carcinogen free to humans at all stages of application or during fire conditions and must not contain hazardous chemicals or require harmful chemicals to clean material or equipment. Firestop material must be free from Ethylene Glycol, Polychlorinated Biphenyl (PCB), Methyl Ethyl Ketone (MEK), or other types of hazardous materials.

C103012 1.1.3 Firestopping Rating

Firestop systems must be UL Fire Resistance Directory listed or FM Approval Guide approved with "F" and "T" rating at least equal to the fire-rating of the fire wall or floor in which penetrating openings are to be protected.

C103012 1.1.3 Through-Penetrations

Firestopping materials for through-penetrations must provide "F", "T", and "L" fire resistance ratings in accordance with ASTM E814 or UL 1479.

C103013 SPRAYED FIRE-RESISTIVE MATERIALS

See PTS Section D40, *Fire Protection*, for additional requirements.

C103013 1.1 SPRAYED FIRE-RESISTIVE MATERIALS

C103013 1.1.1 Quality Assurance

A pre-installation conference must be held with the manufacturer’s approved installer prior to the application of the sprayed fire-resistive materials. See Paragraph C10 1.2 for

field testing requirements for the fire-resistive material. Products provided must not contain asbestos to comply with 40 CFR 763.

C103013 1.1.2 Warranty

Provide manufacturer's standard materials and workmanship warranty stating that the manufacturer agrees to repair or replace materials that fail within 2 years, or as required by the project program, from date of Substantial Completion.

C103013 1.1.3 Material Composition

Provide sprayed fire-resistive material consisting of factory-mixed, dry formulation of gypsum or Portland cement binders and light-weight mineral or synthetic aggregates mixed with water at the Project site, or provide sprayed-fiber fire-resistive material consisting of factory-mixed, dry formulation of inorganic binders, mineral fibers, fillers, and additives conveyed in a dry state by pneumatic equipment and mixed with water at a spray nozzle to form a damp, as-applied product.

C103013 1.1.4 Physical Properties

a. Dry Density: 15 lb/cubic foot (240 kg/cubic meter) for referenced fire-resistance design to attain the ratings indicated, in accordance with ASTM E 605.
b. Thickness: Provide minimum average thickness required for fire-resistance design indicated according to the following criteria, but not less than 0.375 inch (9 mm), per ASTM E 605:

   1) Where the referenced fire-resistance design lists a thickness of 1 inch (25 mm) or greater, the minimum allowable individual thickness of sprayed fire-restive material is the design thickness minus 0.25 inch (6 mm).

   2) Where the referenced fire-resistance design lists a thickness of less than 1 inch (25 mm) but more than 0.375 inch (9 mm), the minimum allowable individual thickness of sprayed fire-resistive material is the greater of 0.375 inch (9 mm) or 75 percent of the design thickness.

   3) No reduction in design thickness is permitted for those fire-resistance designs whose fire-resistance ratings were established at densities of less than 15 lb/cubic foot (240 kg/cubic meter).
c. Bond Strength: 150 lb/sq. ft. (7.2 kPa) minimum in accordance with ASTM E 736.
d. Compressive Strength: 5.21 lb/sq. in. (35.9 kPa) as determined in accordance with ASTM E 761. Minimum thickness of sprayed fire-resistive material tested must be 0.75 inch (19 mm) and minimum dry density must be as specified, but not less than 15 lb/cubic foot (240 kg/cubic meter).
e. Corrosion Resistance: No evidence of corrosion in

accordance with ASTM E 937.

f. Deflection: No cracking, spalling, or delaminating in accordance with ASTM E 759.

g. Effect of Impact on Bonding: No cracking, spalling, or delaminating in accordance with ASTM E 759.

h. Air Erosion: Maximum weight loss of 0.025 g/sq. foot (0.270 g/sq. meter) in 24 hours in accordance with ASTM E 859.

i. Fire-Test-Response Characteristics: Provide sprayed fire-resistive materials with the following surface-burning characteristics in accordance with ASTM E 84 by United Laboratories: flame-spread index of 10 or less and a smoke developed index of 0.

j. Fungal Resistance: No observed growth on specimens in accordance with ASTM G 21.

C103014 ENTRANCE FLOOR GRILLES AND MATS

Provide entrance mats at all entrances to the facility. Comply with Architectural Barriers Act (ABA) Standards for installed entrance mats and frames. Provide recessed entrance mats at building entrances with enclosed vestibule and surface applied entranceway mats or entranceway floor tiles at all other entrances. Entranceway mats and entranceway floor tile require the use of a transition edge where the mat adjoins other floor materials. Mat system must meet ASTM D-2047 coefficient of friction requirements of minimum 0.60 for accessible routes and be structurally capable of withstanding a uniform floor load of 300 lbs/sq. ft. (14 kPa). All portions of mat system must comply with ASTM E 648, Class I, Critical Radiant Flux, minimum 0.45 watts/m2 for flammability.

C103014 1.1 ROLL-UP MATS

Roll-up mats with tread rails spaced a maximum 2 inch (51 mm) on center and running counter to the traffic flow. Mats must allow debris to fall to sub-floor. Tread rails are connected by aluminum or vinyl hinges, with a continuous noise reducing vinyl cushion and an aluminum or vinyl edge around the perimeter. Roll-up mats must be recessed or surface mounted and provided with tread inserts:

C103014 1.1.1 CARPET INSERTS

Carpet insert fiber must be colorfast, solution dyed, anti-static, anti-microbial, and waterproof. Fiber must be 100% nylon or polypropylene, minimum 30 oz. per square yard. Each carpet fiber must be bonded to rigid ply backing to prevent fraying and supplied in continuous splice-free lengths.

C103014 1.1.2 VINYL OR RUBBER INSERTS

Vinyl or rubber inserts must be removable and be made from recycled materials wherever possible. Inserts must have serrated edges and textured surfaces for scraping purposes, bonded to a rigid vinyl or rubber tread insert.

C103014 1.1.3 RECESSED MAT THERMOPLASTIC FRAME PROPERTIES

Thermoplastic frame must be colorfast and UV-resistant. Tensile

strength of frame must comply with ASTM D 638. Tensile impact of frame must comply with ASTM D 1822. Flexural strength of frame must comply with ASTM D 790. Shore D hardness of frame must comply with ASTM D 2240. Rockwell R hardness of frame must comply with ASTM D 785. Coefficient of thermal expansion of frame must comply with ASTM D 696.

C103014 1.1.4 RECESSED MAT ALUMINUM FRAME REQUIREMENTS

Aluminum frame and rail must comply with ASTM B 221, alloy 6063-T5. Frame must have butted corners and be factory coated with zinc chromate or manufacturer's standard protective finish where surfaces are in contact with concrete. Provide standard mill finish, color anodized finish complying with AAMA 606.1, clear anodized finish complying with AAMA 607.1, or bronze complying with ASTM B455, alloy 385.

C103014 1.2 RECYCLED RUBBER TIRE TILES AND MATS

Recycled rubber tire tiles and mats must be made from recycled truck, bus and aircraft tires with sidewall cords and buffed to a chenille finish. Product is bonded to woven flexible backing to form 3/8 to 7/16 inch (9.5 to 11.1 mm) thick, 12 inch (300 mm) square tiles or 12 inch (300 mm) wide rolls up to 25 feet (7.5 m) long.

C103014 1.3 SURFACE MOUNTED/LOOSE-LAY ENTRANCE MATS

Loose-lay mats must have beveled vinyl or rubber transition edge and must have surface of carpet or vinyl/rubber surfaces. Edges must conform to ABA Standards. Mats must be easily removed yet remain adhered to floor to prevent mat from moving as pressure from walking is applied.

C103014 1.3.1 RUBBER OR VINYL MATS

Non-slip mats minimum of 3/8 inch (9.5 mm) thick with square edges for recessed installations or beveled edges for surface applications. Mats must be solid sheet (no perforations), perforated style or corrugated style with knob or flat base bottom surface. Provide surface texture to suite project requirements. Ensure mats are a prime quality compound free of calendaring and curing defects and resistant to weather aging and ozone in normal concentrations.

C103014 1.3.2 CARPET TYPE MATS

Nylon or polypropylene carpet bonded to 1/8 to 1/4 inch (3 to 6 mm) thick, flexible vinyl backing minimum3/8 inch (9.5 mm) thick overall. Carpet has anti-static, anti-staining, non-raveling and anti-microbial properties.

C103014 1.10 SURFACE APPLIED ENTRANCEWAY FLOOR TILE

Applied entranceway floor tiles must be in the form of carpet tiles, carpet tiles with vinyl or rubber scrubbing surfaces, or tiles of thermoplastic scrubbing surfaces only. Tiles must be installed in areas where permanent mat is required but slab is not recessed to receive permanent recess mat. Tiles must be securely installed without obvious seams, cleanable, dimensionally stable, and with maximum

finished tile thickness of 1/2" above finished floor line. Carpet fibers must be 100% nylon or polypropylene, anti-static, anti-microbial, colorfast, solution dyed, mold and mildew resistant, and waterproof with minimum face weight of 30 oz/yd2. Thermoplastic only tiles must be PVC free and UV-resistant.

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 must be wall, ceiling, or above ceiling mounting, and must have a 120V motor that is lubricated for life, quick reversal type, has overload protector, integral gears, and preset accessible limit switches. Screen must be flame retardant, mildew resistant and have black masked borders. Controls must be wall mounted with wiring concealed within the wall construction. Provide pull-down projection screens 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
09/22

C20 GENERAL

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

C20 1.1 DESIGN GUIDANCE

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

Industry standards, codes, and government standards that are referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Federal Facility Criteria (FFC) at the Whole Building Design Guide (WBDG) website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award.

C20 1.1.1 Industry Standards and Codes

AISC American Institute of Steel Construction

C20 1.1.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s): UFC 3-101-01 Architecture UFC 1-200-02 High Performance and Sustainable Building Requirements)

C20 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory stair performance via Performance

Verification Testing, as detailed in this section of the RFP.

C20 1.2.1 Field Testing for Concrete

Field Quality Control Test Reports to be submitted to Designer of Record (DOR) must comply with American Concrete Institute (ACI) 301. If concrete is found to be below the strength required in the tests, remove and replace that concrete and all associated building components at no additional cost to the Government.

C20 1.3 DESIGN SUBMITTALS

Provide design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine Corps Design Procedures,* and UFC 3-101-01, *Architecture*.

C20 1.4 CONSTRUCTION SUBMITTALS

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

Stairs, handrails.

C2010 STAIR CONSTRUCTION

C201001 INTERIOR AND EXTERIOR STAIRS

Provide primed and painted steel stairs with concrete filled pans or cast-in-place concrete stairs for industrial and commercial construction. Design load must not be less than 100 PSF (4.8 kPa) for live load, and 300 pounds (136 kg) for concentrated loads. Required means of egress stairs must conform to to National Fire Protection Association (NFPA) 101. Provide steel guard and handrails.

C201001 1.1 STEEL STAIRS

Design must conform to AISC S335 or AISC S342L.

C201001 1.1.1 Materials

a. Structural Carbon Steel - American Society for Testing and Materials (ASTM) A 36/A 36M
b. Structural Tubing - ASTM A 500
c. Steel Pipe - ASTM A 47
d. Gratings - Gray cast iron ASTM A 48, Class 40
e. Metal plank grating, non-slip requirement, FS RR-G-1602 aluminum ASTM B 209, 6061-T6; steel ASTM A 653/ A 653M, G90.
f. Floor Plates, Patterned - ASTM A 786/A 786M, 14 gage.
g. Anchor Bolts - ASTM A 307
h. Galvanized Structural Steel - All steel exposed to the environment or direct water contact must be galvanized in

accordance with ASTM A 123 /A123M, ASTM A153/A153M, and ASTM A653/A653M, Z275 (G90) coating. Galvanize all components after fabrication in accordance with ASTM A385. Fabricate all steel components in the largest units practical using bolted connections for field assembly. Repair damage to, or voids in, galvanizing in accordance with ASTM A780, Annex A1 or Annex A3.

C201001 1.2 ALUMINUM ALLOY PRODUCTS

Conform to ASTM B 209 for sheet plate, ASTM B 221 for extrusions and ASTM B 26/B 26M or ASTM B 108 for castings. Aluminum extrusions must be at least 1/8-inch (3.2 mm) thick and aluminum plate or sheet at least 0.050 inch (1.27 mm) thick.

C201001 1.3 FINISHES

C201001 1.3.1 Galvanizing

Hot-dip galvanizing: ASTM A 123/A123M, ASTM A 153/A 153M or ASTM A 653/A 653M, G90, as applicable.

C201001 1.3.2 Aluminum Finishes

Protect by plating, Class I anodic coatings, or 70% polyvinylidene fluoride organic coatings. See PTS Section C30, *Interior Finishes*, for additional coatings/finish information.

C201001 1.3.3 Safety Treads

NAAMM BG steel, Type W (welded).

C201001 1.3.4 Other Coatings

See PTS Section C30, *Interior Finishes*, for painted finishes.

C201001 1.4 CONCRETE STAIRS / STEPS

Provide interior or exterior concrete steps and stair with non-slip finish. For interior stairs, provide rubber or other finish treads. For exterior stairs, provide cast-in-place abrasive nosing. Provide steel guard and handrails as necessary. Fire stairs must comply with NFPA 101.

C201001 1.4.1 Materials

a. Concrete - ACI 211.1, ACI 301/301M, and ACI 318/318M, with a compressive strength of 3,000 psi (20,680 kPa) or greater. Concrete Mix Design shall be suitable for the job conditions.
b. Reinforcements - Bars, fabrics, connectors, and chairs must be galvanized.
c. Reinforcing Bars - ACI 301/301M
d. Welded Wire Fabric - ASTM A 185 or ASTM A 497
e. Cast Aluminum Safety Nosings – For exterior concrete stairs, provide safety nosings of cast aluminum with

abrasive surfaces or with abrasive inserts.

C201001 1.5 WOOD STAIRS

Wood stairs area only permitted for residential construction. Provide wood treads of minimum 1-1/4 inch thickness, of clear red or white oak. Risers must 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 must 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 International Building Code (IBC), except delete the handrail design load reduction code exceptions for residential, prisons, industrial, high hazard, and storage facilities. NAAMM Pipe Railing Systems Manual, provide the same size rail and post. Provide series 300 stainless steel pipe collars. Factory coat all metal railings (except for ornamental metals such as brass, bronze, stainless steel, and nickel-silver) with a high performance coating in accordance with American Architectural Manufacturers Association (AAMA) 2605, with a minimum coating thickness of 1.2 mils unless otherwise noted.

C201090 1.1.1 Steel Handrails

Provide steel handrails, including inserts in concrete, steel pipe conforming to ASTM A 53 or structural tubing conforming to ASTM A 500, Grade A or B of equivalent strength. Railings must be hot-dip galvanized and shop painted for exterior applications and primed and shop painted for interior applications. Railing may be unpainted hot-dip galvanized in industrial areas.

C201090 1.1.2 Aluminum Handrails

Provide aluminum pipe railing conforming to ASTM B 429 or square aluminum semi-hollow tube conforming to ASTM B 221. Railings must be coated with a high performance coating or anodized in accordance with AAMA 611, Class I.

C201090 1.1.3 Ornamental Handrails

Provide ornamental railings. Provide anchorage and fasteners as recommended by the product manufacturer. Railing system must 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 must be 6063-T52 aluminum, type 304 stainless steel, brass, or bronze.

C201090 1.1.5 Wood Handrails

Wood handrails area only permitted for residential construction. Provide wood handrails of pre-finished natural hardwood. Wood must be coated with hard acrylic finish to withstand indentations.

C201090 1.1.6 Fiber Reinforced Plastic (FRP) Handrails

Provide FRP handrail structural shapes manufactured by the pultrusion process with qualities, quantities, properties, arrangements and dimensions as necessary to meet the design requirements in accordance with American Society of Civil Engineers (ASCE) 7,29 Code of Federal Regulations (CFR) 1910.23, NFPA 101. Provide integral UV inhibitors within the resin, synthetic surfacing veil to help produce a resin rich surface, and UV resistant coating.

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
09/22

C30 GENERAL

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

All interior finish products must be from manufacturers' standard running line offerings. Custom fabrications are not permitted unless otherwise noted.

C30 1.1 DESIGN GUIDANCE

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

Industry standards, codes, and Government standards referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Federal Facility Criteria (FFC) at the Whole Building Design Guide (WBDG) website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the referenced standard at the time of contract award.

C30 1.1.1 Industry Standards And Codes

FLOOR COVERING INSTALLATION CONTRACTOR'S ASSOCIATION (FCICA)

FLOOR COVERING INSTALLATION BOARD (FCIB)

TILE COUNCIL OF NORTH AMERICA (TCNA)

C30 1.1.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the

following significant UFC(s):
UFC 3-101-01, Architecture
UFC 3-120-10, Interior Design)

UFC 1-200-02 High Performance and Sustainable Building Requirements

C30 1.2 QUALITY ASSURANCE

C30 1.2.1 Paint Applicator's Qualifications

C30 1.2.1.1 Society for Protective Coatings (SSPC) QP 1 Certification

For the application of industrial coatings identified in the Project Program, (Paragraph C30, when industrial coatings are required on large structural members for facilities such as hangars or other large open buildings with exposed structural steel.) all contractors and subcontractors that perform surface preparation or coating application must be certified by the Society for Protective Coatings (formerly Steel Structures Painting Council) (SSPC) to the requirements of SSPC QP 1 prior to contract award, and must remain certified while accomplishing any surface preparation or coating application. 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 and Vehicle Maintenance Flooring Installer Qualifications

The Designer of Record must utilize UFGS Section 09 67 23.15, *Fuel Resistive Resinous Flooring, 3-Coat System*to provide the required installer qualifications for the floor coating system.

C30 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory interior finish assemblies' performance via Performance Verification Testing, as detailed in this section of the RFP.

C30 1.3.1

Provide sample of textured ceiling application for Designer of Record (DOR) approval before resuming work. Sample must 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 must 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 must be used as a reference for remaining application.

C30 1.4 DESIGN SUBMITTALS

Provide design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine Corps Design Procedures,* UFC 3-101-01, *Architecture and UFC 3-120-10, Interior Design*.

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

Changes must not be made to the finishes that are submitted in the plans, specifications, and Structural Interior Design submittals and approved by the Government during the design phase unless changes are requested by the Government. In the event that revisions may be required because of unforeseen conditions such as discontinued product, the revisions must be approved by the DOR and then submitted to the Government Interior Designer for approval before substitutions can be made.

C30 1.5 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) and the NAVFAC Interior Designer must approve the following construction submittals as a minimum:

Paint, Finish materials, Finish colors

Installation drawings for floors with carpet, tile, stone, architectural cast-in-place concrete or terrazzo to include locations and details of seams, color and material transitions, details of divider strips, control joints, and crack control solutions.

Changes must not be made to the finishes that are submitted and approved by the Government during the design phase. In the event that revisions may be required because of unforeseen conditions such as

discontinued product, the revisions must be approved by the DOR and then submitted to the Government Interior Designer for approval before substitutions can be made.

C3010 WALL FINISHES

Provide moisture and mildew resistant interior wall finishes which are easily maintained, and suitable in accordance with industry standards for the architectural surface being finished. For painted wall finishes, refer to C3040 "INTERIOR PAINTING AND SPECIAL COATINGS".

C301001 CONCRETE WALL FINISHES

C301001 1.1 SPECIAL OR ARCHITECTURAL FINISHES ON INTERIOR CONCRETE WALLS

Cast-in-place or pre-cast concrete wall finishes include, but are not limited to, abrasive blasted surfaces, colored surfaces, exposed aggregate, grooved surfaces, or tooled surfaces.

C301002 PLASTER WALL FINISHES

Veneer plaster must be 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 American Society for Testing and Materials (ASTM) C28. High strength gypsum plaster must have a compressive strength of not less than 2,500 psi, when tested dry in accordance with ASTM C472.

C301002 1.1.1

High strength gypsum gaging plaster finish coat must have a compressive strength of not less than 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.

C301002 1.3 ACRYLIC PLASTER COATING

High Performance (impact resistant) seamless interior acrylic coating system must be used as an interior wall finish over CMU that has been joint filled and smoothed with a water resistant manufactured recommended compound. Coating system to be mold and mildew resistant, have a minimum Barcoll Hardness Index of 38 and flame spread 15 or less per ASTM-E84 and have a minimum final film thickness of higher than 10 mils. Coating system must have been on the market and successfully used in commercial applications for a minimum of 10 years. Coating system must be applied by a manufacturer's factory trained applicator/installer.

C301003 GYPSUM WALLBOARD FINISHES

Conform to specifications, standards and requirements in accordance with Gypsum Association GA 214, GA 216 and GA 224. Provide asbestos free materials only. Provide Type X gypsum board in fire rated assemblies. Provide a foil back gypsum board when a vapor retarder is required.

C301003 1.1 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 for exposed layers, square edges for concealed backer layers.

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 FOIL BACKED GYPSUM BOARD

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 for layers exposed to view, square edges for concealed layers. Seal joints in foil backing to other panels and adjoining materials as recommended by the panel manufacturer.

Alternative to foil backed gypsum board in Secured Areas: Field applied foil faced barrier material is an acceptable alternative for pre manufactured foil backed gypsum board. Provide a continuous composite multilayer barrier with a woven polyethylene sheet sandwiched between two sheets of solid reflective aluminum surfaces. Shielding effectiveness tested in accordance with IEEE 229/ ASTM D4935. Install barrier in accordance with manufacturer's instructions.

C301003 1.4 CEMENTITIOUS BACKING UNITS

Provide cementitious backer units, 1/2 inch (12 mm) thick, in accordance with Tile Council of North America Handbook; use as a substrate for ceramic tile in wet areas that are exposed to direct moisture contact or condensation accumulation for areas including, but not limited to, tubs, shower enclosures, saunas, steam rooms, gang shower rooms, and shower drying rooms. Provide screws specifically designed for use with cement panels.

C301003 1.5 IMPACT RESISTANT GYPSUM BOARD

Reinforced gypsum panel with imbedded fiber mesh or polycarbonate resin thermoplastic backing, 5/8 inch (15.9 mm) thick, tapered edges, in accordance with Structural Failure Test; ASTM E695 or ASTM D2394 and Indentation Test; ASTM D5420 or ASTM D1037. Provide metal framing of 20-gauge minimum. Provide fasteners that meet manufacturer requirements and specifications. Impact resistant gypsum board must have a flame spread rating of 25 or less and a smoke developed rating of 50 or less, ASTM E84. Finish with a high strength plaster veneer. Refer to PTS C10 for further requirements on impact resistant wall construction.

C301003 1.6 JOINT TREATMENT

ASTM C475, Joint compound must be specifically formulated and manufactured for use with and compatible with tape, substrate and fasteners as recommended by the manufacturer. Tape and finish gypsum board in accordance with ASTM C840, GA 214 and GA 216. Provide premanufactured joints at all structural expansion joints, crack control joints, and change of materials as recommended by the manufacturer and in accordance with GA 216.

C301003 1.7 FASTENERS

ASTM C514. Fasteners must be compatible with each type of gypsum board material as recommended by the gypsum board manufacturer and in accordance with GA 216 and GA 224.

C301003 1.8 ACCESSORIES

ASTM C1047. Fabricate from corrosion protected steel or plastic designed for intended use. Accessories manufactured with paper flanges are not acceptable. Flanges must be free of dirt, grease, and other materials that may adversely affect bond of joint treatment. Provide prefinished or job decorated materials. 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 1.9 LEVEL OF FINISH

C301003 1.9.1

Tape and finish gypsum board in accordance with ASTM C840, GA 214 and GA 216. Plenum areas above ceilings must be finished to GA 214, Level 1. Water resistant gypsum backing board, ASTM C630/C630M, to receive ceramic tile must be finished to GA 214, Level 2. Walls to receive a heavy-grade wall covering or have textured finish before painting must be finished to GA 214 Level 3. Walls without wall wash lighting to receive paint (MPI Gloss Level 2), light textures, or wall coverings must be finished to GA 214 Level 4. Unless otherwise specified, all gypsum board walls, partitions must be finished to GA 214 Level 5. Provide joint, fastener depression, and corner treatment. Do not use fiberglass mesh tape with conventional drying type joint compounds; use setting or hardening type compounds only. Provide treatment for water-resistant gypsum board as recommended by the gypsum board manufacturer.

C301003 1.9.2

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 1.9.3

Where wall wash lighting will accent the flatness of the wall and surface irregularities in gypsum board joints, provide feature edge gypsum board and two coat joint compound fillers. Provide this special joint treatment at up lighting, down lighting and horizontal lighting at the end of a passageway wall.

C301004 TILE AND TERRAZZO WALL FINISHES

C301004 1.1 CERAMIC TILE WALL SYSTEM FINISHES

Provide ceramic tile wall systems as defined in the Tile Council of North America (TCNA) handbook for ceramic tile installations suitable for the service requirements listed. Install systems in accordance with Tile Council of North America Handbook and American National Standards Institute (ANSI) A108/A118 series standards. Colored epoxy grout with sealer must be provided. Coordinate with ceramic bath accessories for modularity. Include all trim pieces, caps, stops, and returns to complete installation.

C301004 1.1.1

Ceramic Mosaic Wall Tile must be a minimum of 1/4 inch (6 mm) thick and installed from floor to ceiling, unless otherwise noted.

C301004 1.1.2

Wall tile must be glazed, matte glazed or unglazed finish. Refer to project program for tile type, pattern, and surface texture.

C301004 1.1.3

Porcelain wall tile must be through color, polished or unpolished. Refer to project program for tile type, pattern, and surface texture.

C301004 1.1.4

Provide wall tile color and style selections a minimum of one grade above base grade.

C301004 1.1.5

Provide Designer accent tile, accent strips and accessory ceramic tile shapes as an integral part of the ceramic wall tile system.

C301005 WALL COVERINGS

Wall coverings must be material designed specifically for the specified use. The wallcovering must contain a non-mercury based anti-microbial. The wallcovering must be the type made without the use of cadmium-based stabilizers. Wallcovering must 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 must be according to the manufacturer’s printed directions. The manufacturer must approve the installers in writing. The material must be easily cleaned by traditional methods such as washing, wiping, or vacuuming. Primer and adhesive must be of a type recommended by the wallcovering manufacturer and must contain a non-mercury based anti-microbial. Adhesive must 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 must be a vinyl coated woven or nonwoven fabric with germicidal additives and must 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 must 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 must be transparent (clear), medium gloss.

C301005 1.2 FABRIC WALL COVERING

C301005 1.2.1

Fabric wallcovering must be woven material of Polyester or Polyolefin, or a combination of the two fibers with an acrylic backing. The face must be treated with a soil repellent finish. The material must be a minimum of 48 inches (1219 mm) wide. "Tackable" wall covering must 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 must 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 must have an NRC rating of .15 on gypsum board in accordance with ASTM C423.

C301005 1.3 WALLCOVERING BORDER

Vinyl wallcovering border must be a vinyl coated woven or nonwoven fabric with germicidal additives and must 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 must 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 must 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 must be 3/32 inch (2.4 mm) thick and must cover 1 inch (25 mm) each side of corner at right angles. Corner guards

must be clear polycarbonate. Use in executive areas, office areas, and wall-covered areas subject to cart traffic as a minimum.

C301005 1.5.2

Corner guards must be 3/32 inch thick and must cover 2-1/2 inches (64 mm) each side of corner at right angles. Corner guards must be through color polycarbonate or rubber. Use in corridors or other high traffic areas.

If protective wall components from paragraphs C301090 - 1.5 and 1.6 are provided, corner guards must be from the same lot and color as protective wall components.

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 must be 3-1/2 by 3/4 inch (89 mm by 19 mm) solid hardwood, Architectural Woodwork Institute (AWI) Custom grade, with painted or stained finish. Profile must be a molded shape.

C301006 ACOUSTICAL PANELS ADHERED TO WALLS

Acoustical wall treatment must be acoustical panels, sound absorbing wall units, or acoustical wall systems. Acoustical panel system must include manufacturer's standard concealed fasteners, splines, tracks, and other components necessary to complete the installation. Fire rating for the complete composite system must 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 must consist of, seamless fabric covered fiberglass or mineral fiber core system. Perimeter edges must be reinforced by an aluminum frame or a formulated resin edge hardener. Fabric covering must 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 must 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 must consist of continuous perimeter and butt seam mounting extrusions, site-fabricated and applied directly to the substrate. Facing fabric must 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 must be seamless, 100% polyester or olefin or a blend of the two. Light fastness (fadeometer) must 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 must 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 must 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 must be minimum 29 pounds (13 kg). Tensile strength must 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 must be 1 inch (25 mm). Noise Reduction Coefficient must not be 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 must consist of 100% pure acrylic polymer, mineral fillers, and pigments. The material must be homogenous, not coated or laminated, meeting ANSI Z124.3 and ANSI Z124.6 requirements. Superficial damage to a depth of 0.010 inch (.254 mm) must be repairable by sanding or polishing. Provide manufacturer's full range

of colors and patterns. Flammability, ASTM E84: Class I/A, flame spread 25 maximum; smoke developed 30 maximum.

C301090 1.1.1

If used in a shower, solid surfacing wall finishes must extend from top of shower pan to a minimum of 84 inches (2130 mm) or to underside of ceiling and must surround the shower enclosure. Wall finish must extend from top of tub to 84 inches (2130 mm) and must surround tub shower. If used in a kitchen, solid surfacing wall finish must extend from top of kitchen countertop to underside of wall cabinet.

C301090 1.1.2

Provide solid surfacing with factory recommended fasteners/adhesives/caulk to complete the installation.

C301090 1.2 PLASTIC LAMINATE WALL FINISHES

Plastic laminate used for wall applications must be commercial grade, high-pressure laminate with a #60 finish, approved for vertical applications. National Electrical Manufacturers Association (NEMA) LD 3.

C301090 1.2.1

The kitchen wall area between the counter top backsplash and the bottom of the wall cabinet must be plastic laminate. Laminate wall finish must 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, must 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 must be a minimum of 3-1/2 inches (89 mm) high. Profile of chair rail must be a molded shape. Wood trim must 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, must 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 must be Class A (ASTM E84), Underwriters Laboratories (UL) listed, and chemical and stain resistant. It must 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 must be

included. The wall panel system must have coordinating color and pattern options for all components within the system. The wall panel system must 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 1.5.1

Impact Resistant Trim Finishes - Impact resistant chair or handrail system must be a formed rigid PVC product. Chair or handrail must be a minimum of 3 inches (76 mm) high and be mounted with concealed hardware. Chair or handrail system must be chemical, stain, and bacteria resistant. Chair rail must be UL classified, conforming to National Fire Protection Association (NFPA)Class A fire rating and ASTM D256-90b for impact strength of 30.2 ft-lbs/inch thick.

C301090 1.6 CORNER AND WALL GUARDS

Corner and wall guards must be high-impact formed polyvinyl chloride a minimum of 0.078 inch (2 mm) with concealed mounting hardware and end closure. If used with an impact resistant panels system, the guards must be from the same manufacturer as the impact resistant wall panel system, chair or hand rail system and must include all accessories necessary for a complete installation. A full range of styles, colors and textures must be included.

C3020 FLOOR FINISHES

Refer to C3040 "INTERIOR PAINTING AND SPECIAL FINISHES" for painted floor coatings.

C3020 1.1 RESILIENT SUBFLOOR PREPARATION

Have third party independent concrete slab testing agent verify that concrete slabs comply with ASTM F710. Minimum values must not be below the following: Concrete floor flatness must meet minimum flatness of FF 60 when tested in accordance to ASTM E1155 - 96(2008). Concrete levelness on slab on grade must meet minimum levelness of FL 45 when tested in accordance with ASTM E1155 - 96(2008). This requirement does not apply to elevated concrete slabs.

C3020 1.1.1 Floor Preparation

Prior to installation of flooring materials the concrete sub-floors are to be dry, free of curing compounds, sweeping compounds, sealers, hardeners, and other materials which could interfere with bonding of adhesive. If curing compounds, sweeping compounds, bond breakers or sealers exist, they must be completely removed by mechanical means and methods, specifically grinding and shot blasting of concrete surface as necessary. Determine adhesion and dryness characteristics by performing bond and moisture tests. Prior to building being conditioned, perform a preliminary moisture test using in situ probe relative humidity testing as specified per ASTM F 2170.

C3020 1.1.2 Testing

All pre-installation moisture testing is to be performed by a qualified independent testing agency. Perform the following test as soon as building is enclosed, watertight, and conditioned, and a minimum of two months prior to floor covering installation.

a. Moisture Testing: Perform moisture and pH tests as recommended by the flooring and adhesive manufacturers. Perform test starting on the deepest part of the concrete structure. Proceed with installation only after concrete substrates meet or exceed floor covering manufacturer's requirements. In the absence of specific guidance from the flooring manufacturer the following must be the required minimum:

b. Perform concrete internal relative humidity testing using in situ probes in accordance with ASTM F 2170. Proceed with installation only after concrete reaches maximum 75 percent relative humidity level measurement.

C3020 1.1.3 Additional Preparation

If tested moisture levels exceed the allowable limits, shot blast the concrete subfloors to including grinding of areas not accessible to shot blasting equipment and install a 100% solids VOC free epoxy moisture and pH control system as recommended by the third party testing agent.

a. Install cement based self-leveling underlayment over epoxy moisture and pH control system to create a smooth substrate suitable for floor covering and approved by floor covering manufacturer for use with their products.

b. Correct conditions that will impair proper installation.

c. Fill cracks, joints and other irregularities in concrete with leveling compound.

d. Do not use adhesive for filling or leveling purposes.

C3020 1.1.4 Final Cleaning Prior to Flooring Finish Installation

Clean floor of oil, paint, dust, and deleterious substances. Leave floor dry and cured free of residue from existing curing or cleaning agents.

C302001 TILE FLOOR FINISHES

Provide ceramic tile floor systems as defined in the Tile Council of North America (TCNA) handbook for ceramic tile installation and materials for the service requirements listed. Provide installation and materials in accordance with ANSI A108/A118 series standards, except do not use organic adhesives. Provide manufacturer’s full range of colors and styles. Tile must be a minimum of two grades above base grade.

Mortar must be Portland cement, ANSI A108.1A/1B/1C/ A118.1, Latex-Portland

cement, ANSI A108.5/A118.4 or Epoxy ANSI A108.6/A118.3.

Grout must be factory sanded Portland cement, ANSI A108.10/A118.6, Latex-Portland cement, ANSI A108.10/A118.7 or Epoxy ANSI A108.6/A118.3. Provide tile joint grout sealer on white, light colored areas that are routinely exposed to water and liquid cleaning materials, entrance areas, and areas that require a high degree of stain resistance, and as required by the manufacturer. Provide chemical resistant epoxy resin for kitchens and other areas where high resistance to staining and absorption are required, ANSI A118.3.

Slip resistant tile must have a minimum Dynamic Coefficient of Friction (wet and dry) of 0.42, ANSI A137.1-2012. Tile must have smooth, non-slip or textured surface and a glazed or unglazed finish. Non-slip or textured surface required for tile in areas where there is excessive water or grease and oils such as kitchens, dining facilities, shower rooms, toilets, and in industrial and maintenance facilities.

C302001 1.1 CERAMIC MOSAIC UNGLAZED FLOOR TILES

Ceramic Mosaic unglazed floor tiles must be a minimum of 1/4 inch (6 mm) thick with a maximum of 1/16 inch (1.6 mm) grout width with cushioned edge. Tile must have less than a 0.5 percent water absorption rate, ASTM C373.

C302001 1.2 PORCELAIN FLOOR TILE

Porcelain floor tiles must be a minimum of 5/16 inch (8 mm) thick with a maximum of 1/4 inch (6 mm) grout width with cushioned edge. Tile must have a minimum breaking strength of 300 pounds (202 kg), ASTM C648 and a maximum absorption rate of 0.5%, ASTM C373. Tile must be color through, impervious, unglazed or glazed finish with an unpolished, semi-polished, polished, or textured surface.

C302001 1.3 QUARRY FLOOR TILE

Quarry floor tiles must be a minimum of 1/2 inch (12.7 mm) thick tiles with a maximum of 1/4 inch (6 mm) grout width. Tile must have a minimum breaking strength of 350 pounds (158 kg), ASTM C648 and a maximum absorption rate of 3%, ASTM C373. Use grout release for darker pigmented grout colors. Tile must 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 must 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. 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. Patterns must have three (3) colors with (18 gauge) minimum zinc "L" divider strips.

Applicator must be approved by the NTMA and must have a minimum of 5 years experience in the application of the materials to be used and must have a completed 8 successful installations within the past 2 years.

C302002 1.2 RESINOUS TERRAZZO

The resinous terrazzo flooring must be an epoxy terrazzo. All terrazzo, auxiliary products and materials and application techniques used must be approved by National Terrazzo and Mosaic Association (NTMA) and epoxy terrazzo manufacturer, whichever is more stringent, prior to use. These requirements must include, but are not limited to the following;

Epoxy Terrazzo Minimum Requirements:

The contractor must be a member of NTMA and must have a minimum 10 years of application experience and have completed a minimum 5 successful installations over the past five years of similar scope, complexity and minimum of 75 percent of the square footage.

Products must not contain VOC's or formaldehydes. Thickness 3/8" cast in place. Hardness: 60-85 per ASTM D-2240. Tensile Strength: 3,000 psi (min) per ASTM D-638. Compressive Strength: 10,000 psi (min) per ASTM D-695. Chemical Resistance: No deleterious effects per ASTM D-1308

Divider strips/control joints in the terrazzo must be aluminum or brass must occur directly above control joints in the subfloor and be a minimum 18 gauge "L" shape. A flexible crack suppression membrane (elastomeric) installed over entire floor slab surfaces, including all cracks in the subfloor. Flatness tolerance of the slab must be less than 0.25-in flatness variation over 10ft span. Fill areas with 100% epoxy solids with fine aggregates per manufacturer's recommendations for areas which do not meet the flatness tolerance mentioned above. The concrete surface must use shot blasting only (no alternate method to be used). The concrete slab is to be tested for moisture transmission using ASTM F2170 Probe Test. Concrete slabs must be shot-blasted and cleaned to receive epoxy terrazzo moisture vapor primer system as specified by manufacturer and NTMA, whichever is more stringent.

Maintain the ambient room and floor temperature at 60°F or above for a period extending 72 hours before, during and after floor installation. Concrete to receive epoxy terrazzo must have cured for at least 28 days and be free of all curing compounds. Test concrete substrate to determine acceptable moisture levels prior to installation. Testing should be conducted according to ASTM F2170, Probe Test (determining relative humidity in concrete slabs using in situ probes). Concrete slabs must be shot-blasted and cleaned to receive epoxy terrazzo moisture vapor primer system as specified by manufacturer and NTMA, whichever is more stringent. The building must be enclosed and the HVAC system operational prior to and during each day of installation, the terrazzo contractor must verify that the dew point is at least 5° F

(-15° C) less than the slab and air temperature.

Physical properties of the moisture migrating primer must have a maximum of 0.3 perms with 100% RH. Primer must be a material recommended by the resin manufacturer which will penetrate the pores of the substrate and bond with the topping to form a permanent monolithic bond between the substrate and the topping.

Five colors for various patterns and accents throughout the flooring area. Marble chips must not exceed #1 size. Provide a minimum of three 6" x 6" samples for each color and type of terrazzo for review prior to purchase and two 6" lengths of each type of divider strip. Use of post-industrial recycled marble or granite terrazzo chips. When completed, the terrazzo must show a minimum of 70% decorative aggregate chips on the surface.

The finished floor will be rinsed clean, allowed to dry and non-yellowing, slip-resistant & durable water based acrylic sealer. Confirm with user if high polish finish may be used in lieu of sealer. Coordinate with user sheen of polished finish. Use 100% epoxy solids flexible resin, tinted to match adjoining terrazzo matrix per manufacturer's specification.

For concrete slab requirements; See PTS A10-50 Slab on Grade, 1.1.1 Slab on Grade where Resinous Terrazzo Floor Finish is scheduled.

C302003 WOOD FLOORING

C302003 1.1 WOOD FLOORING SYSTEM

Wood strip flooring must 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 must be second grade in accordance with NOFMA Grading Rules. Hard maple must be second and better in accordance with MFMA-01. Red and white oak must be select grade in accordance with NOFMA Grading Rules. Strip flooring must be marked with the trademark of the grading agency. The strip flooring must be NOFMA certified and installed in accordance with NOFMA publication *Installing Hardwood Flooring*. Nails must be as recommended by strip flooring manufacturer’s recommendations. Resilient pads must be pneumatic rubber, PVC, or polyurethane resilient mounts to fit the floor system. Moisture barrier must be 6 mil minimum thickness polyethylene.

C302003 1.1.1

Rooms where wood flooring is to be installed must 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 must be level, steel troweled to a tolerance of 1/8

inch (3 mm) plus or minus in a 10 foot (3048mm) radius. Slab surface must be clean, dry, and approved by wood floor manufacturer prior to start of installation.

C302003 1.1.3

Unless otherwise approved, flooring must be laid parallel to the length of the area to be floored. Strips must 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 must 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 must be left along perimeter walls and around fixed projections through the floor surface.

C302003 1.1.4

Flooring must be sanded to a smooth, even, uniform finish without burns in accordance with the flooring manufacturer’s recommendations. The flooring must 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 must meet or exceed applicable Architectural Barriers Act (ABA) Standards horizontal requirements. Install each type of flooring with recommended adhesive in accordance with the manufacturers' written instructions. Installers must be approved by the manufacturer in writing and must have a minimum of 3 yrs experience for each type of flooring to be installed. Provide and store a minimum of 2% total quantity for each type flooring, color and pattern within each building for future replacement and patching. Provide manufacturers full line of color and pattern selections, including multi-color patterns. Use the resilient floor finishes as identified in the Project Program or as directed below.

C302004 1.1 RESILIENT SHEET FLOORING SYSTEMS

C302004 1.1.1

Resilient linoleum sheet flooring must 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 must extend throughout thickness of material. Gage must be 0.10 inch (2.5 mm). Static load limit must be 250 psi per ASTM F970. Seal linoleum using manufacturer's recommended sealer for commercial application. The manufacturer's technical representative must review and approve each typical sample application on-site prior to resuming the installation and must spot check each 1,196 square yards (1000 square meters) for quality control. Work must not commence on any portion of work until the manufacturer's technical representative renders approval on site. A manufacturer's 5-year warranty is required.

C302004 1.1.2

Resilient rubber sheet flooring must be commercial quality, dimensionally stable, wear resistant, firm and slip resistant with integral color. The rubber sheet flooring must be a three-layer construction consisting of a rubber wear layer, a cushioned layer, and a polyester backing. All components of the construction must be thoroughly vulcanized to prevent delamination. The rubber sheet flooring must conform to ASTM F1860-98 and require no wax maintenance.

C302004 1.1.3

Resilient homogeneous vinyl sheet flooring must 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 must 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 must 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 must require no wax maintenance.

C302004 1.1.4

Resilient heterogeneous vinyl sheet flooring must 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 must include a protective urethane finish for ease of maintenance and conform to ASTM F1303, Type I Grade 1 Class A. Seams must 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 must require no wax maintenance.

C302004 1.2 RESILIENT TILE FLOORING SYSTEM

C302004 1.2.1

Resilient vinyl composition tile (VCT) must be commercial grade, asbestos free, with a nominal overall gauge of 1/8 inch (3 mm) and a wear layer thickness of 1/8 inch (3 mm) nominal. The tile must be manufactured in accordance with ASTM F 1066, Type II, Comp. 1, Class 2, through pattern. Tile must be finished in accordance with manufacturer’s written instructions.

C302004 1.2.2

Resilient static dissipative vinyl composition tile (SDT) must 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 must conform to ASTM F1066, Class 2 through pattern. The flooring must 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 solid vinyl tile/plank must be 0.1 inch (2.5 mm) thick, with a vinyl wear layer of 0.040 inches (1.mm) and must be planks or square tiles. It must include a protective urethane finish for ease of maintenance and conform to ASTM E648, Type III, Class 1 and ASTM F1700, Class III. Provide vinyl flooring that is easily cleaned with off-the-shelf products. Surface finishes requiring manufacturer supplied or special order cleaning solutions are not acceptable. Vinyl flooring must have a marble, granite, stone, terrazzo or wood grain pattern. A manufacturer's 25-year min warranty is required. Products must meet the Buy American Act and be manufactured in ISO 9001 and ISO 14001 compliant factories.

C302004 1.2.4

Provide 100% synthetic rubber tile 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 must 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 must be 100% synthetic heavy rubber or recycled crumb rubber tile, 3/8 inch (9 mm) thick. Rubber tile must conform to ASTM F1344 for recycled crumb rubber tile. The product must 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 must be made with natural raw materials including linseed oil, flour, and rosin or resin binders double calendared onto synthetic jute backing, ASTM F2034, Type I. Pattern and color must extend throughout thickness of material. Gage must be 0.10 inch (2.5 mm). Static load limit must be 250 psi per ASTM F970. Seal linoleum using manufacturer's recommended sealer for commercial application. The manufacturer's technical representative must review and approve each typical sample application on-site prior to resuming the installation and must spot check each 1,196 square yards (1000 square meters) for quality control. Work must not commence on any portion of work until the manufacturer's technical representative renders approval on site. A manufacturer's 5-year warranty is required.

C302005 CARPETING

C302005 1.1 GENERAL

Installer(s) must be approved by the manufacturer in writing. Carpet manufacturer must be established and in good standing with the industry. A minimum of 5% total quantity for each color and pattern must be provided and stored within the building for future replacement patching.

C302005 1.2 CARPET PILE FIBER

Provide one of the following:

a. 100% premium branded, yarn-dyed, Type 6.6 continuous hollow filament nylon
b. 100% premium branded, solution-dyed, Type 6 or Type 6.6 continuous hollow filament nylon
c. 100% premium branded, combination yarn dyed and solution-dyed, Type 6 or Type 6.6 continuous hollow filament nylon

C302005 1.3 CARPET BACKING REQUIREMENTS

a. Provide manufacturer's standard high performance carpet backing.
b. Moisture resistant carpet backing must pass the 24-hour British Spill Test.
c. Moisture proof carpet backing must pass the 10,000 Impacts Test.
d. Provide moisture resistant carpet backing with an attached urethane cushion, minimum 18 lb. density.
e. Provide moisture proof carpet backing with integral high density cushion of thermoplastic, urethane, or PVC.

C302005 1.4 CARPET PERFORMANCE CHARACTERISTICS

a. Flammability: Carpet must meet the Critical Radiant Flux Classification of not less than 0.45 W/sq. cm. when tested in accordance with ASTM E648. Carpet must generate less than 450 rating when tested in accordance with ASTM E662
b. Static Control: Carpet must include a permanent static control system to control static build-up to less than 3.0 KV in accordance with AATCC-134.
c. Dimensional Stability: Carpet must be permanently dimensionally stable with no delamination of components or any edge raveling or zippering. Edge Ravel: Minimum 1 lb. loop pile only - ASTM D-7267; Delamination: Minimum 3.5 lb. per inch of width - ASTM D-3936; Tuft Bind: Minimum 10 lb. average tuft bind for loop pile - ASTM D-1335; Tuft Bind: Minimum 8 lb. average tuft bind for (Modular Tile) loop pile - ASTM D-1335.
d. Colorfastness to Crocking: Not less than 4, wet and dry, per AATCC-165.
e. Colorfastness to Light: Not less than 4 after 40 AFU (AATCC fading units) per AATCC-16.
f. Antimicrobial Activity: Not less than 0.08-inch (2-mm) halo of inhibition for gram-positive bacteria; not less than 0.04-inch (1-mm) halo of inhibition for gram-negative bacteria; no fungal growth, per AATCC-174.

g. Appearance Retention: Provide carpet with a medium scale (>3" repeat) or large scale (>6" repeat), multi-color pattern for excellent appearance retention and soil hiding characteristics. Heathered yarn without a pattern is unacceptable unless approved by the NAVFAC Interior Designer as an accent carpet.
h. Sustainability: Provide carpets with recycled fiber content, and renewable material content in the attached cushion or backing materials certified by an independent testing agency. Recycle Content of the Total Product Weight: Must be either Pre-consumer or Post-consumer content or a combination of these. Broadloom: minimum of 10%; Modular Tile: minimum of 30%.
i. Product Sustainability Certification: To achieve superior performance in multiple environmental attribute areas, carpet must have third party certification in accordance with NSF/ANSI 140 Sustainable Carpet Assessment Standard at a "Gold" level minimum. Carpet manufacturer must supply certificate as part of the procurement documentation.
j. Indoor Air Quality: Provide carpets that meet the criteria of the CRI "Green Label Plus" Indoor Air Quality Testing Program. Carpet adhesive VOC's must be less than 50 g/L..
k. Reclamation of existing carpet to be determined with potential vendor. When carpet is replaced, submit certification documentation from the reclamation facility to the Contracting Officer.
l. Written Warranty: Lifetime commercial warranty for texture retention and edge raveling, zippering, de-lamination is required. Seam preparation and adhesives must be recommended by the carpet manufacturer in accordance with the warranty. Submit a copy of the manufacturer's standard warranty to the Contracting Officer within 60 days of BOD. Government must be a beneficiary of the terms of this warranty.
m. Texture Appearance Retention Rating (TARR): The carpet should be evaluated using ASTM D-5252, Hexapod Drum Test, as the commercial carpet test procedure and TARR classification determined by ASTM D-7330. Carpet must meet TARR ratings specified below:

Space Definition	Traffic Classification	TARR Classification
Private Offices	Moderate	> 3.0 TARR
Training, Conference, etc.	Heavy	> 3.0 TARR
Open Office, Corridors, Lobbies, etc.	Severe	> 3.5 TARR

C302005 1.5 CARPET INSTALLATION

Install carpet by one of the following methods in accordance the manufacturer's recommendations and in accordance with the Carpet and Rug Institute, CRI-104, Standard for Installation Specification of

Commercial Carpet, compatible with the construction, backing, and pattern characteristics of each carpet provided.

a. Direct Glue Down Carpet Installation
b. Double Glue Down Carpet and Pad Installation
c. Carpet with Attached-Cushion Installation
d. Preapplied releasable "dry" adhesive system installation.
e. Stretch-In Carpet Installation with tack strips and pad

C302006 MASONRY AND STONE FLOORING

C302006 1.1 UNIT MASONRY FLOORING SYSTEM

Unit masonry flooring system and coordinating base must 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 must be of marble, granite, or travertine.

C302006 1.2.2

Aggregate Stone Tile and coordinating base must 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 must be 4 inch (100 mm) high and 1/8 inch (3.2 mm) thick as required unless indicated otherwise. The wall base must include inside and outside corners and must conform to ASTM F1861-98, Type TS. Provide wall base in rolls and not 4

foot lengths.

C302007 1.1.2

Flash-coved integral resilient sheet wall bases must 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 must 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 must 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 must coordinate with the adjacent flooring and must 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 must utilize UFGS Section 09 67 23.15, *Fuel Resistive Resinous Flooring, 3-Coat System*, 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 must 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 must be proportioned and sealed in standard moisture resistant bags. The manufacturer must guarantee their aggregate to be free of rust, corrosive materials, oil, petroleum, or other water-base materials when delivered. The manufacturer must replace any material found to contain any such materials, or any other material, which is deemed unsatisfactory. The manufacturer must 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, must 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 must 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 must be as recommended by the manufacturer of the aggregate surface hardener system and ASTM C309 or ASTM C1315. All installation must 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 must receive a minimum of two coats of hardener-sealer curing agent for dust protection. These hardener-sealer-cured floors must be finished with a curing agent that must penetrate the

concrete to permanently seal the floor against moisture and the penetration of contaminants. The curing agent must be non-toxic, non-flammable, and non-combustible and must be installed in accordance with the manufacturer’s printed instructions. The finished floor must be dust-free.

C302010 1.2 COLORED CONCRETE FLOORS

Colored concrete floors must 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 must be trowel applied in a pattern, or must 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 must 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 must 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 must 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 ABA Standards.

C302011 1.6 INSTALLATION

Install access floor system and accessories under supervision of the access flooring manufacturers authorized representative to insure rigid, firm installation free of vibration, rocking, rattle, squeaks, and other unacceptable performance. Install in accordance with the following;

a. Set pedestal in adhesive as recommended by the access flooring manufacturer to provide full bearing of the pedestal base on the sub floor.
b. Layout floor panel installation to keep the number of cut panels at the floor perimeter at a minimum. Scribe panel assemblies at the perimeter to provide a close fir with no voids greater than 1/18" where panels abut vertical surfaces. At spaces where access floor connects to the walls provide connection detail that seals the access floor to the wall to reduce air leakage.
c. Secure grid member to pedestal heads in accordance with access floor manufacturer’s instructions.
d. Thoroughly clean up dust, dirt and construction debris caused by floor installation.
e. Level installed access floor to within 0.060" of true level over the entire area and within 0.10" in any 10" distance.

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 must 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 must have minimum 60% recycled content except as noted. Acoustical ceiling panels must 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 tiles unless otherwise noted.

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, Auditoriums	.70	35-39
Conference Rooms, Classrooms	.60	35-39
Activity spaces, Lobbies, Corridors	.60	35-39
Executive and Private 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 up-lighted ceilings, window lighted ceilings, and as recommended by the manufacturer. Provide Type X gypsum board in fire rated assemblies.

C303002 1.1 REGULAR GYPSUM BOARD

ASTM C36/C36M and ASTM C1396/C1396M, 1/2 or 5/8 inch (12.7 mm or 15.9 mm) thick, tapered edge. Provide 5/8 inch (15.9 mm) for all projects except for single family residential, which may utilize 1/2 inch (12.7 mm) if other requirements, such as sound control, are met.

C303002 1.2 MOISTURE RESISTANT GYPSUM BOARD

ASTM C630/C630M, 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 FOIL BACKED GYPSUM BOARD

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 for layers exposed to view, square edges for concealed layers. Seal joints in foil backing to other panels and adjoining materials as recommended by the panel manufacturer.

Alternative to foil backed gypsum board in Secured Areas: Field applied foil faced barrier material is an acceptable alternative for pre manufactured foil backed gypsum board. Provide a continuous composite multilayer barrier with a woven polyethylene sheet sandwiched between two sheets of solid reflective aluminum surfaces. Shielding effectiveness tested in accordance with IEEE 229/ ASTM D4935. Install barrier in accordance with manufactures instructions

C303002 1.4 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 1.5 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 must have a flame spread rating of 25 or less and a smoke developed rating of 50 or less, ASTM E84. Finish with a high strength veneer plaster.

C303002 1.6 TEXTURED CEILING FINISH SYSTEM

Applied textured ceiling finish must be plaster based. Refer to paragraph "C301002 - 1.1 GYPSUM PLASTER" for finish requirements.

C303002 1.7 JOINT TREATMENT

ASTM C475, Joint compound must be specifically formulated and manufactured for use with and compatible with tape, substrate and fasteners as recommended by the manufacturer. Tape and finish gypsum board in accordance with ASTM C840, GA 214 and GA 216. Provide premanufactured joints at all structural expansion joints, crack control joints, and change of materials as recommended by the manufacturer and in accordance with GA 216.

C303002 1.8 FASTENERS

ASTM C514, Fasteners must be compatible with each type of gypsum board material as recommended by the gypsum board manufacturer and in accordance with GA 216 and GA 224.

C303002 1.9 ACCESSORIES

ASTM C1047, Fabricate from corrosion protected steel or plastic designed for intended use. Accessories manufactured with paper flanges are not acceptable. Flanges must be free of dirt, grease, and other materials that may adversely affect bond of joint treatment. Provide prefinished or job decorated materials. Install as recommended by GA 214, GA 216 and GA 224.

C303002 1.10 LEVEL OF FINISH

C303002 1.10.1

Tape and finish gypsum board in accordance with ASTM C840, GA 214 and GA 216. Ceilings to receive a heavy-grade wall covering or heavy textured finish before painting must be finished to GA 214, Level 3. Ceilings without critical lighting to receive flat paints, light textures, or wall coverings must be finished to GA 214, Level 4. Unless otherwise specified, all gypsum board walls, partitions and ceilings must be finished to GA 214, Level 5. Provide joint, fastener depression, and corner treatment. Do not use fiberglass mesh tape with conventional drying type joint compounds; use setting or hardening type compounds only. Provide treatment for water-resistant gypsum board as recommended by the gypsum board manufacturer.

C303002 1.10.2

Wherever gypsum board is to receive eggshell, semigloss or gloss paint finish, or where severe, up or down lighting conditions occur, finish gypsum wall surface to GA 214 Level 5. In accordance with GA 214 Level 5, apply a thin skim coat of joint compound to the entire gypsum board surface, after the two-coat joint and fastener treatment is complete and dry.

C303003 PLASTER CEILING FINISHES

C303003 1.1 VENEER PLASTER CEILING FINISHES SYSTEM

Veneer plaster ceilings must be gypsum plaster veneer finish to gypsum base finishes. Refer to Section C3040 for paint system and gloss level. Provide gypsum neat plaster, gypsum ready-mixed plaster, or high strength gypsum plaster base coat conforming to ASTM C28. High strength gypsum plaster must have a compressive strength of not less than 2,500 psi, when tested dry in accordance with ASTM C472.

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 must 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 must 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 must 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 must 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 must 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

Apply coatings directly to all non-prefinished surfaces of the interior construction. Comply with Master Painters Institute requirements for surface degradation analysis, surface preparation, paint and coating selection, paint application restrictions for substrate materials, and paint application.

C304001 GENERAL REQUIREMENTS

All paint must be suitable in accordance with the Master Painter Institute (MPI) standards for the interior architectural surface being finished. The current MPI, "Approved Product List" as of the date of contract award, will be used to determine compliance with the submittal requirements of this specification. The Contractor may choose to use a more current MPI "Approved Product List"; however, only one list may be used for the entire contract. All coats on a particular substrate, or a paint system, must be from a single manufacturer. No variation from the MPI Approved Products List is acceptable.

Select paint systems for the project in accordance with the MPI Architectural Painting Decision Tree available on the Whole Building Design Guide. Use this interactive MPI Decision Tree website to identify applicable paint system(s) for the project. The MPI Decision Tree identifies paint systems for each interior or exterior coated surface in "Normal" or "Aggressive" environmental conditions and generally lists the applicable paint systems in descending order of performance. The paint system at the top of each substrate list generally indicates the highest performing acceptable coating system.

Choose the "Aggressive" environmental conditions in the MPI Decision Tree for exterior systems that are used in moist humid conditions, abrasive conditions, chemical exposure conditions, or within five miles proximity of the ocean or a body of water. Also use "Aggressive " environmental conditions in interior spaces that are exposed to in moist humid conditions, abrasive conditions, chemical exposure conditions, such as bathrooms, shower rooms, kitchens, chemical storage area, swimming pools, laundry, sanitary areas, commercial kitchens, industrial production areas, and hospital operating rooms provide paint systems that comply with the MPI Decision Tree "Aggressive" environmental conditions.

Comply with the following rules when determining the appropriate paint or

coating system from the MPI Decision Tree:

a. Some of these paint systems are identified with a "NAVFAC Anchor". This "NAVFAC Anchor" indicates the minimum performing system that NAVFAC will accept for that substrate and environmental conditions.

b. When multiple "NAVFAC Anchors" are indicated on a certain substrate and environmental condition, provide the "NAVFAC Anchor" paint or coating system that is most appropriate for the facility use.

c. If only one MPI Decision Tree choice is available for a certain substrate and environmental condition with no indicated NAVFAC preference, provide that sole option for NAVFAC projects.

d. If the MPI Decision Tree provides multiple choices and no NAVFAC preference is denoted, refer to the Additional RFP Requirements below to determine level of performance.

e. If the MPI Decision Tree does not identify all paint system applicable to the facility, utilize the *MPI Architectural Painting, Exterior Systems Manual* to identify other appropriate paint systems for the project. Utilize the "Premium Grade" systems and comply with all limitations stated in the MPI "Approved Product List" for each paint product. Products having an MPI VOC Range E3 must be given preferential consideration over lower VOC Ranges. Use higher performing paint systems unless the lower performing paint system can be justified based on a lifecycle cost to include surface preparation, application, disposal, environmental impact, and required recoating cycles. Only use paint products that have been tested for MPI'S "DETAILED PERFORMANCE" or "EVALUATED PERFORMANCE ". Do not use products that have only been tested for "INTENDED USE".

f. If an "Aggressive" environmental condition option is not available in the MPI Decision Tree for a certain substrate, use the "Normal" environmental condition option.

g. Refer to the Additional Exterior Paint and Coating System Requirements below for further system requirements.

Paints and coatings must comply with Master Painters Institute Green Performance Standard GPS-1-12 which is available at the following website; http://www.specifygreen.com/EvrPerf/EnvironmentalPerformance.html. Provide Interior flat intermediate and topcoats of a maximum of 50 g/L VOC and interior non-flat intermediate and topcoats of a maximum 150 g/L VOC. Choose paints that provide performance and are environmentally friendly by using total VOC budgeting to analyze the total impact of all flat, non-flat and special purpose coatings on the project.

C304001 1.1 MPI GLOSS LEVELS

Gloss levels must comply with the MPI system of determining gloss as defined in the Evaluation sections of the MPI Manuals. Utilize the performance characteristics of the paint gloss and sheen to categorize paint rather than manufactures' description of his product. The MPI Gloss Levels are indicated by the notation G1, G2, G3, G4, G5, G6, or G7. G1 is not used by Navy.

The MPI Decision Tree indicates a default gloss level for each paint system, however consider the appearance, anticipated conditions, and need for cleaning when choosing the correct gloss level for each coated surface of the project. Comply with the following guidance in choosing the appropriate gloss level.

a. Use G2 "Velvet-like" Flat for ceilings, residential walls away from human contact and low traffic areas.

b. Use G3 "Eggshell-like" in high traffic areas for ceilings and walls, when human contact with the wall is expected but limited, and for dark accent colors.

c. Use G5 Semigloss for walls, doors and trim for high durability and clean ability and when a surface is expected to have routine human contact.

d. Use G6 Gloss only in special situations such as piping identification or special effects.

The MPI Gloss and Sheen Standard values are measured per ASTM D523, and are as follows:

Gloss Level Number	**Gloss@ 60 Degrees**	**Sheen@85 Degrees**
Gloss Level 1(G1) - Matte or Flat	Max.5 units	Max.10 units
Gloss Level 2(G2) - "Velvet-like" Flat	Max. 10 units	10-35 units
Gloss Level 3(G3) - "Eggshell-like"	Max. 10-25 units	10-35 units
Gloss Level 4(G4) - "Satin-like"	Max. 20-35 units	Min. 35 units
Gloss Level 5(G5) - Semi-Gloss	35-70 units	
Gloss Level 6(G6) - Gloss	70-85 units	
Gloss Level 7(G7) - High Gloss	More than 85 units	

C304001 1.2 MPI SYSTEM DESIGNATIONS AND ABBREVIATIONS

The MPI coating system number in each Division is found in either the *MPI Architectural Painting Specification Manual* or the *Maintenance Repainting Manual* and defined as an interior system (INT/RIN).

a. INT designates an interior coating system for new surfaces.
b. RIN designates an interior coating system used in repainting projects or over existing coating systems.
c. DSD - the MPI short-term designation for Degree of Surface Degradation as defined in the Assessment sections in the *MPI Maintenance Repainting Manual*. Degree of Surface Degradation designates the MPI Standard for description and appearance of existing condition of surfaces to be painted. This DSD classification is used to determine the proper surface preparation necessary for painting.

C304001 1.3 SURFACE PREPARATION

Comply with the "Interior Surface Preparation" section of the *MPI Architectural Painting Specification Manual* or the "Interior Surface Preparation" section of the *MPI Maintenance Repainting Manual*. All

suggestive language such as "may" or "should" are deleted from the standard and "must" inserted in its place. Suggestive language such as "recommended" or "advisable" is deleted from the standard and "require" or 'required" inserted in its place. The results of these wording substitutions change this document to required procedures. For surface preparation, determine a MPI DSD Assessment of each surface and comply with the MPI Surface Preparation Requirements relating to the assessments. Notwithstanding MPI requirements, clean interior ferrous metal to a SSPC SP 10 level (near white) that have aggressive chemical environments (SSPC Zones 3A, 3B, 3C, 3D, and 3E) or waterfront exposure to open structures (SSPC Zones 2A or 2B). Examples of these types of facilities are indoor water training facilities, indoor swimming pools, and open or mostly open waterfront maintenance buildings/ waterfront warehouses/ canopies.

Remove dirt, splinters, loose particles, grease, oil, and other foreign matter and substances deleterious to coating performance as specified for each substrate before application of paint or surface treatments. For existing buildings, use MPI *Maintenance Repainting Manual* to determine the coatings that need to be removed. Remove deteriorated or loose coatings before repainting begins. Oil and grease must be removed prior to mechanical cleaning. Cleaning must be programmed so that dust and other contaminants will not fall on wet, newly painted surfaces. Exposed ferrous metals such as nail heads on or in contact with surfaces to be painted with water-thinned paints, must be spot-primed with a suitable corrosion-inhibitive primer capable of preventing flash rusting and compatible with the coating specified for the adjacent areas.

C304001 1.4 ADDITIONAL INTERIOR PAINT AND COATING SYSTEMS

In addition to the MPI Decision Tree, comply with the following paint system requirements:

C304001 1.4.1 PAVEMENT COATINGS

(1) INT 3.2 Concrete Horizontal Surfaces

Normal Environmental Conditions; Pigmented

Provide road and parking lot pavement marking in accordance with UFGS Section 32 17 23, *Pavement Markings*.

C304001 1.4.2 DRESSED LUMBER

Provide Pigmented systems for Composite Wood Doors (Fiberboard) and trim. Do not use Normal/ Aggressive; Clear and Normal/ Aggressive Stain finishes.

C304007 SPECIAL COATINGS TO WALLS

C304007 1.1 HIGH PERFORMANCE ARCHITECTURAL COATING (HIPAC)

HIPAC must be a durable, organic system applied to a continuous (seamless) high-build film and cure to a hard glaze finish. They must be resistant to continuous heat and humidity, abrasion, staining,

chemicals, and biological growth. Coating must 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 must 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) must be 340 grams/liter.

C304007 1.1.2

Single Component, Moisture-Curing Urethane must 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 must be composed of pure acrylic polymers, silica dioxide, ethylene dioxide and pigments. System must have a Barcoll Hardness Index of 38.0 or greater, 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) Coating system must have been on the market and successfully used in commercial applications for a minimum of 10 years.

C304007 1.2.1 CMU Application

High Performance seamless interior acrylic coating system must be used as an interior wall finish over CMU that has been joint-filled and smoothed with a water resistant manufactured recommended compound. Coating system to be mold and mildew resistant, flame spread 15 or less per ASTM-E84 and have a minimum final film thickness of 7 mils.

C304007 1.2.2 Gypsum Wallboard Application

High Performance seamless interior acrylic coating system must be

used as an interior wall finish over gypsum wallboard. Do not prime or seal the drywall except as specifically recommended by the texture acrylic coating manufacturer. Coating system to be mold and mildew resistant, flame spread 8.5 or less per ASTM-E84 and have a minimum final film thickness of 20 mils.

C304007 1.2.3 Installation

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 must be products of the same manufacturer.

A minimum of one sample wall application must be provided. Edges at door and window frames must be feathered; hard edges are unacceptable. Upon approval of the sample wall by the project manager, the application must 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 representatives.

-- End of Section --

SECTION D10

CONVEYING
06/23

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D10 GENERAL

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

Comply with the requirements of UFC 1-200-01, *DoD Building Code*.

D10 1.1 DESIGN GUIDANCE

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

Industry standards, codes, and Government standards referenced in the section text that are **not** found in the Unified Master Reference List (UMRL) in the Federal Facility Criteria (FFC) at the Whole Building Design Guide (WBDG) website, are listed below for basic designation identification. Refer to the UMRL for full reference standard title and current document date. Comply with the required and advisory portions of the current edition of the referenced standard at the time of contract award.

D10 1.1.1 Industry Standards and Codes

Although some the following references are listed in the UMRL, they are repeated here for emphasis.

References publications in this RFP that refer to the "authority having jurisdiction" must be interpreted to mean the "Contracting Officer."

AMERICAN GEAR MANUFACTURERS' ASSOCIATION (ANSI/AGMA)

6035 Design, Rating and Application of

Industrial Globoidal Wormgearing

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI B4.1	Preferred Limits and Fits for Cylindrical Parts

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7	Minimum Design Load for Buildings and Other Structures

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME A17.1	Safety Code for Elevators and Escalators
ASME A17.2	Guide for Inspection of Elevators, Escalators and Moving Walks
ASME A18.1	Safety Standard for Platform Lifts and Stairway Chairlifts
ASME B20.1	Safety Standards for Conveyors and Related Equipment
ASME B30.10	Hooks
ASME B30.2	Safety Standard for Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A27	Mild to Medium Strength Carbon Steel Castings for General Application
ASTM A36	Structural Steel
ASTM A434	Standard Specification for Steel Bars, Alloy, Hot-Wrought or Cold-finished, Quenched and Tempered
ASTM A521	Standard Specification for Steel, Closed Impression Die Forgings for General Industrial Use.

ASTM A563	Standard Specification for Carbon and Alloy Steel Nuts (NOT in Spec TEXT)
ASTM A1023/A	Standard Specification for Stranded Carbon Steel Wire Ropes for General Purposes (NOT in Spec TEXT)
ASTM E1417	Standard Practice for Liquid Penetrant Examination (NOT in Spec TEXT)

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	Structural Welding Code Steel (NOT in Spec TEXT)

NATIONAL FIRE PROTECTION ASSOCIATION

NFPA 70	National Electric Code

RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS (RCSC)

RSCS	Specification for Structural Joints Using High-Strength Bolts

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE J995	Mechanical and Material Requirements for Steel Nuts
SAE J123	Surface Discontinuities on Bolts, Screws, and Studs in Fatigue Applications

D10 1.1.2 Government Standards

NAVAL FACILITIES ENGINEERING COMMAND (NAVFAC)

NAVFAC P-307	Management of Weight Handling Equipment

NAVAL SEA SYSTEMS COMMAND (NAVSEA)

T9074-AS-GIB-010/271	Requirements for Nondestructive Testing Methods.

US NATIONAL ARCHIVES AND RECORDS - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (NARA/ OSHA) - Code of Federal Regulations (CFR)

29 CFR, Part 1910.23	Guarding Floor and Wall Openings and Holes
29 CFR, Part 1910.27	Fixed Ladders
29 CFR, Part 1910.179	Overhead and Gantry Cranes
29 CFR, Part 1910.306	Specific Purpose Equipment and Installations

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

UFC 1-200-01	DoD Building Code (General Building Requirements)(UFC 1-200-01 is a hub document that provides general building requirements and references other critical UFCs. A reference to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs listed in the document.)
UFC 1-200-02	High Performance and Sustainable Building Requirements

D10 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory Conveying systems performance via Performance Verification Testing, as detailed in this section of the RFP.

D10 1.2.1 Testing and Inspections for Elevators

a. Conduct all testing and inspections in the presence of both the Elevator Specialist and a NAVFAC Certified Elevator Inspector. The Elevator Inspector must complete, sign and post the results of all tests and inspection results after successful completion of inspection and testing. The Contractor is responsible for all costs involved with reinspection and retesting required to correct

discrepancies discovered during testing and the subsequent retesting required, including all costs and expenses incurred by the Government Furnished Inspector.

b. Testing Materials and Instruments
Provide testing materials and instruments required for final inspection, including a current equipment calibration certification.

c. Field Tests for Elevators

In addition to the tests required by AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) A17.1 AND ASME A17.2, perform the following:

(1) Endurance Tests - Test each elevator for a period of one hour continuous run, with specified rated load in the car. Restart the one hour test period from beginning, following any shutdown or failure. During the test run, stop car at each floor in both directions of travel for standing period of 10 seconds per floor. Meet the requirements for Rated Speed, Leveling, Temperature Rise, and Motor Amperes testing specified herein throughout the duration of the Endurance test.

(2) Speed Tests - Determine actual speed of each elevator in both directions of travel with rated load and with no load in elevator car. Minimum acceptable elevator speed is the Rated speed specified. Maximum acceptable elevator speed is 110 percent of Rated speed.

(3) Leveling Tests - Test elevator car leveling devices for landing accuracy of plus or minus 1/4-inch (6 mm) at each floor with no load in car, symmetrical load in car, and with rated load in car in both directions of travel. Car sill must be level with landing sills.

(4) Temperature Rise Tests - Determine temperature rise of elevator hoisting motor, motor-generator, exciter, and booster during full-load test run for one hour minimum. Under these conditions, maximum acceptable temperature rise must not exceed acceptable temperature rise indicated on manufacturer's data plate. Start test only when equipment is within 9 degrees F (5 degrees C) of ambient temperature.

(5) Motor Ampere Tests - Measure and record motor amperage when motor is running and elevator is lifting at rated load and speed. Measure and record motor amperage at beginning and end of Endurance test. Test results must not exceed nameplate amperage when motor is running and elevator is lifting at rated load speed.

(6) Balance Load for Electric Elevators Tests - Perform electrical and mechanical balance load tests of car and counterweight.

(7) Automatic Shutoff Valve Tests - For hydraulic elevators, test the automatic shutoff valve twice. Once at

beginning of acceptance test and again at conclusion of one-hour Endurance test to ensure consistent performance of shutoff valve, regardless of temperature of equipment and oil.

(8) Perform miscellaneous tests called for in this Section.

D10 1.2.2 Crane System and Monorail with Hoist/Trolley System Installation and Certification

Provide verification of satisfactory conveying systems performance via Inspection and Testing, as detailed in this section of the RFP. Erect and install the crane or monorail system, complete in accordance with the approved submittals and in condition to successfully perform the inspections, operational tests, and acceptance tests listed below. In addition, provide statements and certifications listed below.

a. Certification

The following certifications are required to be submitted and approved prior to acceptance load testing.

(1) Load Chain or Wire Rope - Submit wire rope or chain manufacturer's certification of minimum wire rope or load chain breaking force for each hoist.

(2) Overload Test Certificate - Submit a statement that the crane or monorail system and hoist/trolley can be periodically load tested at up to 125 percent of rated load.

(3) Loss of Power Test Certificate - Submit a statement that the crane or monorail system can be subjected to loss of power testing without damage (See paragraph entitled "Load Test").

(4) Hazardous Material Certificate - Submit a statement that the crane or monorail system contains no asbestos, lead paint, polychlorinated biphenyl's (PCB's), elemental mercury and that chromates have been avoided where feasible.

(5) Hook Proof Test - Submit a statement that load and suspension hooks have been proof tested and satisfy the acceptance criteria of ASME B30.10.

(6) Welding Certifications

(a) Submit a statement that all welders, welding operators, weld inspectors and welding procedures meet the requirements of AMERICAN WELDING SOCIETY (AWS) D14.1 for all work performed in manufacturing the cranes.

(b) Submit a statement that all welders, welding

operators, weld inspectors, and welding procedures meet the requirements of AWS D1.1 for all field welds.

(7) Design Review by Professional Engineer - Submit a statement that non-commercial component design and any modifications to commercial products have been reviewed by a professional engineer. Indicate on the certificate, the name, state of licensure and license number of the professional engineer.

(8) Crane Runway Rail - For runway rails provided as part of this contract, submit survey data and a statement that the runway rails are in accordance with the requirements of CRANE MANUFACTURERS' ASSOCIATION OF AMERICA (CMAA) 70, Table 1.4.2-1, or MH 27.1, Figure 1, as applicable.

(9) Frequency Allocation Application - Complete the technical section of the Application for Equipment Frequency Allocation, Form DD 1494, addressing the radio equipment provided, submitted by the manufacturer of the radio control equipment being furnished under this contract.

b. Inspection and Testing

After erection, jointly inspect the crane or monorail system and associated components to determine compliance with specifications and approved submittals with representatives of the Contracting Officer and of the end user's Weight Handling Equipment (WHE) Certifying Official. The WHE certifying official is the designated representative of the supported command empowered to designate lifting and handling equipment acceptable for use. Provide a report of the inspection indicating the crane or monorail system is considered ready for operational tests

(1) Operational Tests - After erection and inspection, test the crane or monorail system and hoist/trolley as specified herein. Test the systems in service to determine that each component operates as specified, is properly installed and adjusted, and is free from defects in material, manufacture, installation, and workmanship. Rectify all deficiencies disclosed by testing and retest the system or component under load to prove the system is operational. Furnish loads for testing, operating personnel, instruments, and all other necessary apparatus.

(2) Test Data - Record test data on appropriate test record forms suitable for retention for the life of the crane or monorail system. Record operating and startup current measurements for electrical equipment (motors) using appropriate instrumentation (i.e., clamp-on ammeters). In addition, note, investigate, and correct high temperatures or abnormal operation of any equipment or machinery. Record function speeds during each test cycle.

(3) Hook Measurement

(a) Measure hook for hook throat spread before and after load test. Establish a throat dimension base measurement by installing two tram points and measuring the distance between these tram points. Record this base dimension. Measure the distance between tram points after load test. Any twist or increase in the throat opening from the base measurement will be cause for rejection.

(b) Hook Identification - Uniquely identify each hook and nut or eye pin (and swivel eye bar as applicable) with some type of permanent marking in order to provide positive traceability to the non-destructive test report. Mark hooks in low stress areas using low stress marking methods.

(4) Load and Suspension Hook Inspection - Non-Destructive Test (NDT) the entire hook, eye pin (and swivel eye bar as applicable) for defects. No linear indications greater than 1/16 inch (1.6 mm) is the acceptance criterion. Acceptance criteria for external hook threads may be based on the acceptance criteria in SAE standard J123. Use magnetic particle method in accordance with NAVAL SEA SYSTEMS COMMAND (NAVSEA) Technical Publication T9074-AS-GIB-010/271 for NDT. American Society for Testing and Materials (ASTM) A275 may be used with the following restrictions: DC yokes (including switchable AC/DC yokes used in the DC mode) and permanent magnet yokes must not be used; automatic powder blowers or any other form of forced air other than from a hand-held bulb must not be used for the application or removal of dry magnetic particles; arc strikes shall be removed; and equipment ammeters must have an accuracy of +/- 5 percent of full scale (equipment ammeter accuracy other than that stated is acceptable provided the MT procedure states that a magnetic field indicator is used to establish and verify adequate field strength for all aspects of the inspection). For hooks of non-magnetic material, use liquid penetrant (PT) method in accordance with ASTM E 1417 or T9074-AS-GIB-010/271 for NDT. For PT testing of hooks containing stainless steels, titanium, or nickel-based alloys, total halogens, and sulphur used in the NDT process must be controlled as specified in T9074-AS-GIB-010/271. If NDT cannot be performed on surfaces inside small holes (e.g. hook/nut captivation roll pin holes), visually inspect those surfaces to the maximum extent practical. Perform NDT prior to load tests.

(5). Non-Destructive Test Quality Assurance Requirements.

(a) The magnetic particle inspection report must include a letter from the performing vendor certifying that the vendor meets the requirements of ASTM E543. Provide current certification, within one year of the date the NDT was performed.

(b) In addition, include report procedures, for review, including technique sheets specific to the types, shapes, and sizes of the parts being examined (e.g., shank hook, eye hook, duplex hook, eye pin, swivel eye bar). Describe the orientation of the hook or pin to the magnetizing equipment in the procedures.

(c) Indicate review by an independent Level III examiner certified in the applicable NDT method and not an employee of the NDT vendor in the procedures.

(d) In lieu of a., b., and c. above, state in the NDT report that non-destructive testing was performed per Crosby Quality Control Procedure No. 0120, Revision 16, and Technique Sheet No. 319N, Revision 1, or Gunnebo Johnson Quality System Procedure QSP-69, Revision A.

(6) No-Load Test

(a) Hoist: Lower and raise each load hook through the hoist range. Operate at various speeds in both directions. Operate each load hook slowly the full operating lift distance into the hoist primary limit switch or stop and verify satisfactory operation of hoist, upper limit switch or stop, and lower limit switch or stop. Verify that a minimum of two wraps remain on the drum for wire rope hoists and that the load chain is slack on the dead end side for chain hoists when the lower limit switch is engaged. If the hoist is equipped with slow down limits, verify proper operation during the hook travel test. For electric or air powered hoists with primary and secondary limit switches, bypass the primary upper limit switch and check for proper operation of the backup limit switch. For electric hoists, verify all power to hoist is removed upon actuation of backup limit switch, and the keyswitch reenergizes hoist and allows operation in the down direction only. Operate the hoist at gradually increasing speed to full speed in the up direction until the primary upper limit switch activates. Verify that the hoist stops prior to secondary limit switch operation. Operate the hoist at gradually increasing speed to full speed in the up direction with the primary limit switch bypassed until the secondary upper limit switch is activated. Verify that the hoist stops prior to the load block contacting any portion of the hoist frame. For hoists with two electromechanical brakes, remove power to the crane and observe the proper timing sequence in the application of the primary and secondary brake.

(b) Trolley: Operate the trolley the full length of the monorail or crane bridge rails in both directions. Check the existence of OSHA required 2 inch side and 3 inch overhead clearances during the trolley operation check. Operate at all various speeds in each direction.

Verify proper trolley brake operation, if equipped. Slowly contact all trolley stops with the bumpers to verify even bumper contact and that there will be no contact between the crane and any obstruction within the crane envelope with the bumpers fully compressed. Contact the trolley stops with the bumpers at full rated speed, unpowered, and verify structural integrity and that there was no contact between the crane and any obstruction within the crane envelope with the bumpers fully compressed.

(c) Bridge (if equipped): Operate the crane assembly the full length of the crane runway in both directions. Check the existence of OSHA required 2 inch side and 3 inch overhead clearances during the bridge operation check. Operate at all available speeds in each direction. Verify proper bridge brake operation, if equipped. Slowly contact all bridge end stops with crane bumpers to verify even bumper contact and structural integrity and that there will be no contact between the crane and any obstruction within the crane envelope with the bumpers fully compressed. Contact the runway stops with the bumpers at full rated speed, unpowered, and verify structural integrity and that there was no contact between the crane and any obstruction within the crane envelope with the bumpers fully compressed.

(7) Rated Load Speed Test - Test at 100 percent (plus 0 percent minus 5) of rated capacity. If the crane is equipped with multiple trolleys that are used to achieve the rated load of the crane (e.g., two 2,000 pound trolleys which together allow for a 4,000 pound maximum capacity), then perform this bridge rated load speed test with the multiple trolleys loaded simultaneously.

(a) With the hoist loaded to rated capacity, raise and lower the load and record maximum and minimum load speeds in each direction. Also record the voltage and steady state motor amperage draw in both directions at maximum speed. Verify that the hoisting and lowering speeds are provided as specified. Verify slow speed operation (if equipped).

(b) If the capacity overload limit activates during lifting of the rated load (typical of the adjustable type), verify that the drive stops and the load can only be lowered. Bypass capacity overload device utilizing keyswitch and continue with test.

(c) With the hoist loaded to rated capacity and the load lifted a minimum distance, operate the trolley along the crane bridge, or monorail and record maximum and minimum load speeds in each direction. Also record the steady state motor amperage draw in both directions at maximum speed. Verify that the trolley speeds are provided as

specified. Further, verify that the trolley comes to a stop from maximum speed in each direction within a distance (in feet) equal to 10 percent of rated capacity high speed (in feet per minute). Verify slow speed operation (if equipped).

(d) With the hoist loaded to rated capacity and the load lifted a minimum distance, operate crane bridge (if equipped) along the crane runway and record maximum and minimum load speeds in each direction. Also record the steady state motor amperage draw in both directions at maximum speed. Verify that the bridge speeds are provided as specified. Further, verify that the crane bridge comes to a stop from maximum speed in each direction within a distance (in feet) equal to 10 percent of rated capacity high speed (in feet per minute). Verify slow speed operation (if equipped).

(e) With the hoist loaded to rated capacity and the load lifted a minimum distance, operate the swing function (if equipped) at maximum and minimum radius and record maximum and minimum load speeds in each direction. If swing function is powered, record the steady state motor amperage draw in both directions at maximum speed. Verify that the swing speeds are provided as specified. Further, verify that the boom comes to a stop and retains its position. Verify slow speed operation (if equipped).

(8) Rated Load Deflection Test - Test at 100 Percent (plus 0 percent minus 5) of rated capacity.

(a) With the unloaded trolley moved to one end of the bridge or monorail, measure the height of a point near the midpoint of a bridge crane, near the midpoint of the longest unsupported length of a monorail.

(b) With the hoist loaded to rated capacity, move the trolley to the midpoint of the bridge, midpoint of the longest unsupported length of a monorail. Repeat the measurement taken in step a. Record the difference between the measurements taken in step a. and step b.

(c) Verify that the difference recorded in step b. is less than 1/888 of the span for top running and cambered underunning girder bridge cranes, 1/600 of the span for uncambered underrunning bridge cranes, 1/450 of the longest unsupported length for monorails. Patented track deflection may not exceed 1.25 inch regardless of span.

(d) For bridge cranes, move the unloaded bridge crane over a runway structural support, move the trolley to the opposite end of the bridge, and measure the height of a point near the midpoint of the longest unsupported length of runway. Hoist a load at rated capacity a minimum distance, move the trolley to the end of the

bridge nearest the structural support, and travel the bridge to the midpoint of the longest unsupported length of runway. Repeat the measurement. Record the difference between the measurements. Verify that the difference is less than 1/450 of the unsupported span length for patented rail and underrunning runways, or 1/600 of the longest unsupported length for top running rolled shape runways. Patented track deflection may not exceed 1.25 inch regardless of span.

(9) Load Test - Test at 125 Percent (plus 0 percent minus 5) of rated capacity. If the crane is equipped with multiple hoists or trolleys that are used to achieve the rated load of the crane (e.g., two 2,000 pound trolleys which together allow for a 4,000 pound maximum capacity), then perform these tests with the multiple hoists or trolleys loaded simultaneously. During load testing, only lift the test load a minimum height as necessary to perform the specified tests.

(a) If the capacity overload limit activates during lifting of the test load (typical of the adjustable type), verify that the drive stops and the load can only be lowered. Bypass capacity overload device utilizing keyswitch and continue with test

(b) Hoist Static Test: Raise test load approximately 12 inches (300 mm) above the floor and hold for 10 minutes. Rotate load and hook 360 degrees clockwise and counter-clockwise to check bearing operation. Observe for load lowering that may occur indicating possible malfunction of hoisting components or brakes. Lower the test load to the floor until the hoist line is slack.

(c) Hoist Dynamic Test: Raise the test load using all available speeds. Lower the load back to the floor using all speeds. Visually observe smooth control and acceleration/deceleration between speeds. Stop the test load at least once while hoisting and once while lowering at highest speed and observe that the brake stops and holds the load. Repeat the above cycle for at least 15 minutes.

(d) Load Brake Test (for powered hoists equipped with mechanical load brake and single holding brake):

1. Raise test load no more than 5 feet (1.5 meters). With the hoist controller in the neutral position, release the holding brake. The load brake must hold the test load.

2. Raise test load the minimum amount to perform the following test. Again, with the holding brake in the released position, start the test load down slowly and return the controller to the neutral position as the test load lowers. The load brake must stop and

hold the test load.

3. Document the method used to release the holding brake. Brake release method must be recorded to enable repeating that method during later periodic load testing by the end user. Methods of releasing the holding brake vary from hoist to hoist depending upon the design of the brake and hoist and must be specified by the crane manufacturer prior to testing.

(e) Trolley: With test load hoisted to a minimum height, operate the trolley the full distance of the monorail or crane bridge in both directions using slow speed. Verify satisfactory operation. Verify proper brake operation, if equipped.

(f) Bridge (if equipped): With test load hoisted to a minimum height and the trolley at one end of the bridge, operate the crane assembly the full length of the crane runway. Move the trolley to the opposite end of the bridge, then operate the crane assembly the full length of the crane runway in the opposite direction. Verify satisfactory operation and that bridge trucks move without binding. Verify proper brake operation, if equipped.

(g) Loss of Power Test: Raise the test load approximately 3 feet (900 mm) and while lowering test load, disconnect main power to hoist and return the hoist controller to neutral. Load must stop. Repeat the test for the trolley, bridge and swing functions, as applicable.

c. Field Test Reports.

(1) Brake Adjustment Records. Provide a brake adjustment record for each brake on the crane or monorail system that contains the adjusted air gap, measured brake lining thickness, measured torque spring length, as well as the manufacturer provided range of acceptable measurement for each. Submit the brake adjustment records on the official form, which can be obtained from the Contracting Officer upon request.

(2) Field Test Record. Upon successful completion of all testing, submit a copy of the completed test record and all test data.

(3) After the crane has passed the acceptance test, complete a control system parameter record for the crane including all control system parameters, and explanation of their functions, and their final settings. Designate each control system parameter as either used or unused.

D10 1.3 DESIGN SUBMITTALS

Provide design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine Corps Design Procedures*, UFC 3-101-01, *Architecture* and UFC 3-301-01, *Structural Engineering*. Provide design submittals that include the following items:

a. Elevators and Weight Handling Equipment (WHE):

(1) Drawings. Show the design of the track beam system, including weight handling equipment curves and switches, principal dimensions, details of structural connections, all component details, and electrical one-line diagrams. Show clearances between elevator and/ or crane structure and building and identify interferences. Provide weight handling equipment wheel load diagrams and hook configuration.

(2) Specification. Provide edited version(s) of the UFGS elevator and weight handling equipment specification(s) that are applicable to this project. Edit the UFGS's in accordance with restrictions of RFP Part 4 - PTS Section Z10 and refer to Part 2 Section 01 33 10.05 20, *Design Submittal Procedures* for format and further specification requirements. Do not add or delete requirements to the UFGS for weight handling equipment unless specifically approved by Navy Crane Center. Edit UFGS for weight handling equipment only to add project specific information such as capacity and hook height. Submit the applicable UFGS as a part of the Contractor originated design submittal, DO NOT submit RFP Part 4 - D10 as part of the design submittal.

If this RFP includes a type of elevator and weight handling equipment that is not covered in this D10 PTS Section and is specified in a Prescriptive Specification located RFP Part 5, include this Prescriptive Specification in the Contractor's design submittal without modification.

(3) Catalog Cuts. Include catalog cuts in addition to the UFGS sections for all major components. Mark and highlight all catalog cuts to identify all the specific components that are applicable to the project.

D10 1.4 CONSTRUCTION SUBMITTALS

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

a. Construction Submittals for Vertical Transportation Equipment (VTE)

(1) Elevator Construction Submittals

In addition to the submittal requirements of ASME A17.1, provide the following submittals:

Detail drawings must include dimensioned layouts in plan and

elevation showing the arrangement of elevator equipment, accessories, supporting systems, anchorage of equipment and anchorage forces from seismic, gravity, impact, etc. loads, clearances for maintenance and operation; and details on hoistway, doors and frames, operation and signal stations, controllers, motors, guide rails and brackets, and points of interface with normal power, fire alarm system, HVAC or exhaust systems, and interface with emergency power systems. Drawings must show any revised building electrical system required to make supplied elevator system function as specified. Drawings must contain complete wiring diagrams showing electrical connections and other details required to demonstrate sequence of operations and functions of system devices. Drawings must include the appropriate sizing of electrical protective devices, which are frequently different from National Electrical Code standard sizes.

Submit one set of wiring diagrams in plastic or glass cover, framed and mounted in elevator machine room. Deliver other sets to Contracting Officer. Coded diagrams are not acceptable unless adequately identified.

(2) Construction Submittals for Facility Electronic Operation and Maintenance Support Information (eOMSI):

Submit final submittals for eOMSI Submittal. After approval by the DOR and sign-offs by the elevator inspector, assimilate construction submittals into the OMSI manuals required under Part 2 Section 01 78 24.00 20, *Facility Data Workbook (FDW)*.

b. Construction Submittals for Weight Handling Equipment (WHE):

(1) Drawings. Submit to DOR for approval, the construction submittal and drawings described below. After DOR approval submit to the Government for approval or surveillance as required in Part 2 Section 01 33 00.05 20, *Construction Submittal Procedures.* Manufacturer's catalog data will suffice for standard commercial products. Each assembly and subassembly drawing must include an integral Bill of Materials or must be followed by a consecutively numbered drawing with the applicable Bill of Materials.

(a) General Arrangement Drawings. Show in plan, elevation and end view the crane or monorail system assembly and each major component, including runways for underrunning cranes to demonstrate proper interface with the facility building. Show all major features including: clearances, lifts, speeds, hook approaches (on all sides), maximum wheel loads (without impact), electrical or pneumatic power supply, and general locations of components such as: hoists, trolleys, brakes, motors, speed reducers, and control panels (including size). Indicate torque value or tightening method (e.g. turn of the nut) for bolts on the drawing. In addition, show estimated weights for major components (girders, trolleys, runway beams, control panels and end trucks) and the completely assembled crane. Provide approximate locations of center of gravity and location of lifting points for completely assembled crane and for each major component with the design drawings.

(b) Structural Drawings. Show fabrication details including all weldments, fastener joints, structural components, and list of materials for fabricated crane girders (including end stops), fabricated trolleys and fabricated end trucks on these drawings. Specify the type of structural bolted connection (i.e. slip critical, snug-tightened, or pretensioned) on the drawing.

(c) Mechanical Drawings. Show the layout of mechanical equipment on cranes and monorail systems on the drawings, in particular drive arrangements (including assembled components). On pneumatically powered cranes, show the layout of pneumatic equipment, including control panel enclosures, motors, brakes, limit switches, piping and valves on the drawings. The drawings must also include:

1. Complete schematic diagram of pneumatic systems with narrative of any special description of operation. All components shown on schematics must have labels that correspond to the nameplates that will be on the crane. Pipe material and size must be included.

2. Rating and types of over-pressure protective devices.

3. Complete assembly diagrams including a component material list. Show on the drawings the layout of pneumatic equipment on the crane including: motors, brakes, limit switches, conduits, and piping systems.

(d) Electrical Drawings. Show the layout of electrical equipment on cranes and monorail systems, including control panel enclosures, motors, brakes, limit switches, conduits, disconnects, and conductor systems on the drawings. The drawings must also include:

1. Complete schematic diagram with narrative of any special description of operation. All components shown on schematics must have labels that correspond to the nameplates that will be on the crane. Wiring type, size, and temperature ratings must be included on schematic diagrams. Remove all optional equipment not included in this project from the schematic diagrams.

2. Motor nameplate data (including all information called for in NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 70, Section 430.7 (A) items 1 through 7)

3. Rating and types of over-current protective devices.

4. Complete assembly (wiring) diagrams including a component material list. Show on the drawings, the layout of electrical equipment on the crane, including control panel enclosures, motors, brakes, limit switches, conduits, and conductor systems.

5. Layout diagrams showing component placement in

control panel enclosures.

(2) Product Data. Provide manufacturer's catalog data for all major components of cranes and monorail systems. Mark-up or supplement the catalog cuts with additional sheets to clearly identify the model or size, selected options, features, and/or modifications to demonstrate compliance with specification requirements. Catalog cuts which show modifications beyond the standard options and all supplemental pages must bear original signatures and dates of the equipment manufacturer's authorized representative. Clearly identify the item on the catalog cuts and each supplemental sheet to which it applies.

(a) Structural Product Data. Submit product data for Bridge End Trucks, Trolley Frame, Patented Track, Runway and Bridge Rails and Support System, and End Stops.

(b) Mechanical Product Data. Submit product data for Speed Reducers, Brakes (including electrical information), Bearings, Couplings, Load Blocks, Hoist/Trolley (if procured as a packaged unit), Hose Reels, Oilers, Pressure Regulators and Bumpers.

(c) Electrical Product Data. Submit product data for Variable Frequency Drives, Motors, Electrical Enclosures, Runway Electrification and Collectors, Limit Switches, Bridge to Trolley Electrification, Pendant or Radio Control Station, Warning and Pilot Devices, Disconnect Switches, and Fuses and Circuit breakers.

(3) Design Data. Provide calculations that demonstrate compliance with all design requirements. Design data will not be approved if their evaluation/review is dependent on data or information not previously approved. List and define all variables at the beginning of each calculation section; variables must be in accordance with required references. Include sufficient information in the design data, so that they may be approved without reference to detail (shop) drawings.

When there is one hoist on one monorail system, the monorail system rated capacity and the hoist rated capacity will be equal. When there is more than one hoist on the monorail system, the rated capacity of the monorail track beam system must be designed equal to the sum of the two hoists rated capacities. An exception to this is that if the two hoists are separated by positive track beam stops and distance so that the track beam is strength-wise essentially two independent track beam systems.

(a) Structural Calculations. Submit calculations verifying the sizing of any track, track suspension device and additional supports, which are not the runway or monorail system manufacturer's standard cataloged product. Include support reactions and recommended method of connecting/attaching the support. Provide calculations verifying compliance with Section 3 of CMAA No.70 or No. 74 or Section 6 of MH 27.1. In addition to Load Cases 1 and 2 of

CMAA No. 70 and 74, the following load combinations are also required in the crane design calculations:

1. CMAA Case 3: Test Loads. The crane will be periodically tested up to 125% of rated capacity. Combined stresses for the following load combinations must be calculated to ensure structural adequacy during testing:

DL (DLFB) + TL (DLFT) + LL (1 + HLF) + IFD + SK

Test Loads (Stress Level 3). In this calculation use LL = 1.25 x rated capacity. Do not consider the test and extraordinary loads in the fatigue analysis. Formula abbreviations correspond to principal loads as defined in CMAA #70 and 74, Section 3.3. The subscripts T and B refer to trolley and bridge, respectively.

2. CMAA Case 4: Seismic Load. Provide seismic analysis in accordance with AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE) 7-05. Consider loading condition in an event while the crane is operating at rated capacity without lowering or dropping the load.

3. Calculations verifying design of runway and bridge rail stops and bumpers in accordance with the dynamic requirements of Association for Iron and Steel Technology (AIST) TR-06.

4. For cranes that operate outdoor without wind protection, calculations determining the wind speed that will cause the crane travel, trolley, and rotate functions to drive through the brake with the brakes set, and, for rail mounted or wheel mounted cranes, the wind speed that will cause the crane to slide on the rail or runway surface with the brakes set.

(b) Mechanical Calculations. Calculations verifying compliance with Section 4 of CMAA #70, regardless of crane type, for any non-commercial items.

(c) Electrical Calculations

1. Minimum required horsepower for each drive motor - Motor power rating must be based upon the formulae given in CMAA #70 regardless of crane type. For hoist motor sizing calculations, the factor "Kc" must not be less than 1.0. For bridge and trolley drive motor sizing calculations, the factor "E" must be the published gear reducer efficiency ratings. For the bridge drive the minimum acceleration rate must be 4 seconds and 2 seconds for simulated plugging (deceleration). For the trolley drive the minimum acceleration rate must be 3 seconds and 1.5 seconds for simulated plugging. Calculations are not required for packaged hoists, but packaged hoists must still meet acceleration and

deceleration requirements.

2. Overcurrent protection.

3. Conductor sizing and Conduit fill calculations (using tables from NFPA 70, Chapter 9 or manufacturer's data sheets).

4. Protective device coordination study showing proper coordination for any overcurrent devices that have the same rating as another overcurrent device upstream

5. Transformer sizing.

6. Drive controller sizing for hoist motors.

(4) Facility Electronic Operation and Maintenance Data, Documents, and Training Information. Submit the WHE's operation and maintenance data, document, and training information to be incorporated in the Part 2 Section 01 78 24.00 20, *Facility Data Workbook (FDW*) submittal. Make a copy of the eOMSI submittal available at the acceptance test. Include in the eOMSI submittal a table of contents, operation instructions, preventive maintenance instructions including maintenance, training materials, and programming instructions for the adjustable frequency drives, parts information, a drawing list, design drawings, lubrication drawing supply list, catalog cuts, photographs as needed to explain maintenance or repair procedures, and calculations. Provide maintenance instructions to include recommended maintenance procedures and component manufacturer's installation and maintenance manuals and lubrication instructions. Include detailed crane operating and safety instructions in the operating instructions. Parts information must include information on purchased sub-assemblies and components, including manufacturer's original part number, and detailed drawings of Contractor-designed parts. Break-out the parts information into the smallest replacement part.

(5) Provide onsite training for unique critical job skills associated with the crane or attachments

(6) Field Test Reports. Submit a copy of all Field Reports.

D1010 ELEVATORS AND LIFTS

Comply with the *UFC 3-490-06 Elevators* for the design and construction of elevators.

D1010 1.1 QUALIFICATION OF MANUFACTURER AND INSTALLER

Provide elevator by manufacturer regularly engaged in the manufacture of elevator systems. Manufacturer must either install elevator system or provide letter of endorsement certifying that installer is acceptable to manufacturer. Installer is required to be regularly engaged in installation and maintenance of elevator systems.

If the project is located in the State of Hawaii, perform work involving the installation or repair of elevator equipment under the supervision of a person who is licensed in elevator repair in the State of Hawaii or who possesses the equivalent experience. Furnish data to the Contracting Officer for verification that the person exercising direct supervision of the work possesses such experience.

D101001 GENERAL CONSTRUCTION ITEMS

Comply with ASME A17.1 AND ASME A17.2 in their entirety, and additional requirements specified herein. Install in accordance with manufacturer's instructions, ASME A17.1, DoD Architectural Barriers Act (ABA) and Deputy Secretary of Defense (DEPSECDEF) Memorandum (dated October 31, 2011), and NFPA 70. Do not cut or alter Structural Members. Restore damaged or defaced work to original condition. Include recesses, cutouts, slots, holes, patching, grouting, and refinishing to accommodate installation. Use core drilling to drill new holes in concrete ensuring that no existing reinforcing is cut. Finish work to be straight, level, and plumb. During installation, protect machinery and equipment from dirt, water, or mechanical damage. At completion, clean all work, and repair any prefinished items that have been damaged during the performance of the work.

Elevators that are intended to carry personnel other than one (1) operator must be classified as a passenger elevator. Passenger elevators that are intended to carry furniture or equipment, must have an oversized cab. Refer to the Project Program for the type of elevator required.

D101001 1.1 TRAFFIC ANALYSIS

Provide a traffic analysis in accordance with criteria established by a nationally recognized elevator manufacturer's association and conduct interviews with the User to determine the following:

a. Passenger or Freight
b. Rated load
c. Rated speed
d. Travel length
e. Number of stops
f. Number of hoistway openings
g. Car platform and hoistway door opening dimensions
h. Hoistway Door Type
i. Car Door type
j. For Freight Elevators, identify Class Loading Type - Class A, B, or C, to handle loads as indicated on the project program.

D101001 1.2 ELEVATOR MACHINE ROOM

Provide a machine room for every elevator. Locate the elevator machine and controller in the Elevator Machine Room.

D101002 PASSENGER ELEVATORS

D101002 1.1 HOISTWAY AND CAR EQUIPMENT

D101002 1.1.1 Car and Counterweight Guide Rails and Fastenings

Paint rail shanks with one coat of black enamel. Only T-section type guide rail is acceptable.

D101002 1.1.2 Pit Channel

Provide pit channel for anchorage of main guide rail brackets and also for anchorage of counterweight guide rail brackets and buffer for electric elevators. Each channel must span distance between guides. Fully grout both pit channels on completion of guide rail and buffer installation.

D101002 1.1.3 Pit "STOP" Switch

Provide push/pull type pit "STOP".

D101002 1.1.4 Wiring and Traveling Cables

Suspend cables by means of self-tightening webbed devices.

D101002 1.2 CAR AND LANDING DOOR EQUIPMENT

D101002 1.2.1 Infrared Curtain Unit

Provide Infrared Curtain Unit (ICU) with multiple infrared beams that protect to the full height of the door opening. Extend minimum coverage from 2 inches (50 mm) off the floor to 70 inches (1778 mm) above floor level.

D101002 1.2.2 Hoistway Entrance Frames

Provide 14 gage (1.8 mm) thick #4 brushed stainless steel door frame unless directed otherwise by Contracting Officer. Solidly grout uprights of entrance ways to height of 5 feet (1500 mm).

D101002 1.2.3 Car and Hoistway Landing Sills

Car and Hoistway Landing Sill - Provide one piece cast solid white bronze or nickel silver entrance sill. Use same material for hoistway and car entrance sills. Solidly grout under full length of sill.

D101002 1.3 IN-CAR AND LANDING FIXTURES

D101002 1.3.1 Car and Hall Buttons

Provide recessed vandal-resistant push buttons of minimum 3/4-inch (19 mm) size satin-finish stainless steel with illuminating jewel center.

D101002 1.3.2 Position and Direction Indicators

Provide position and direction indicators in car and at each landing.

D101002 1.3.3 Direction Audible Signals

Provide audible signals in car and at each landing.

D101002 1.4 CAR AND CAB EQUIPMENT

D101002 1.4.1 Roller Guides

Provide coil-spring loaded roller guide assemblies in adjustable mountings on each side of car and counterweight frames in accurate alignment at top and bottom of frames.

D101002 1.4.2 Certificate Window

Provide 4 inch (100 mm) high by 6 inch (150 mm) wide certificate window in car operating panel for elevator inspection certificate.

D101002 1.4.3 Cab Ventilation

Provide natural and forced ventilation with two-speed fan.

D101002 1.4.4 Protection Pads and Mounting Hooks

Provide stainless-steel hooks and fire retardant protective pads for one elevator in a set.

D101002 1.4.5 Car Enclosure

Car Shell Return Panels, Entrance Columns, Cove Base, and Transom: Provide 14 gage (1.9 mm) minimum non perforated steel. Apply sound-deadening mastic on all exterior components.

Provide finishes for the elevator cab interior that are appropriate for the type of facility. Finishes must not exceed the flame spread rates mandated by ASME A17.1.

D101002 1.4.6 Car Size

Provide ~~at least one~~ **both** elevator**s** of a size and arrangement to accommodate an ambulance stretcher in the open, horizontal position. The minimum size of the ambulance stretcher used to design the elevator must be 24 inch by 84 inch (609.6 mm by 2133.6 mm) with not less than 5 inch (127 mm) radius corners. Identify all stretcher accessible elevators with the international symbol for emergency medical services (Star of Life).

D101002 1.5 ELEVATOR CONTROLLER

D101002 1.5.1 Non-proprietary Controller

Provide micro-processor controllers from controller manufacturers who provide generic controllers that are designed to function with all or most manufacturers elevator equipment. The manufacturer of the controller must engage solely in the manufacture and sale of controllers to the elevator industry and not engage in the elevator installation, service, or maintenance.

The follow controller manufactures comply with this requirement:

a. Elevator Controls Corporation, 3525 La Grande Boulevard, Sacramento, CA 95823

b. G.A.L. Manufacturing Corporation, 50 East 153th Street, Bronx, New York 10451

c. Motion Control Engineering, Inc., 11354 Whiterock Road, Rancho Cordova, CA 95742-6522

d. Virginia Controls, Inc., 2513 Mechanicsville Turnpike, Richmond, VA 23223

e. Computerized Elevator Control Corporation (Swift), 24 Empire Blvd., Moonachie, NJ 07074-1303

The following are required features of the generic micro-processor controllers and manufacturers training:

a. On-Board Diagnostic Panel

(1) Provide a non-proprietary micro-processor controller for each individual elevator and group controller. Provide an on-board diagnostic control and LCD display panel that allows unrestricted access to the comprehensive range of adjustable parameters necessary to perform installation, adjusting, service, maintenance, and testing of the elevator.

(2) Provide LCD displays with the capability to display, monitor, and diagnose any and all fault logs, fault history, trouble calls, and diagnostics. Provide three (3) copies of the complete manufacturer's software program, with complete software documentation, that must enable the same level of unrestricted access to all controllers of the same make and model, regardless of the installation date or location.

b. External Port - For each individual elevator and group controller, provide a USB port or an RS 232 port that allows connection to an on-site portable laptop computer. Provide the same level of unrestricted access as the on-board diagnostic panel.

c. Repair Requirements - For repair of the microprocessor control system(s), provide maintenance tools, supporting computer software, and software documentation required for complete maintenance of elevator system including diagnostics and adjustments. On-board diagnostic panels must not require recharging to maintain their memory or authorization for use. Software must not require periodic reprogramming, or reauthorization. Store programs in non-volatile memory.

d. Training - The elevator controller manufacturer must offer and conduct technical support and factory training that is available to all state licensed elevator service providers qualified to bid on navy elevator maintenance service contracts. Include in the

factory training all aspects of the installation, service, and maintenance of the elevator controller.

D101002 1.6 OPERATIONAL CONTROLS

D101002 1.6.1 Independent Service

Provide exposed key-operated switch in car operating panel to enable independent service.

D101002 1.6.2 Hoistway Access Switches

Provide key-operated hoistway access switch to permit limited movement of car at terminal floors for car positioning, operative only when "INSPECTION" switch in car operating panel is in the "INSPECTION" position. Locate switch 6 feet (1800 mm) above floor level, within 12 inches (300 mm) of hoistway entrance frame or with only ferrule exposed when located in entrance frame.

D101002 1.6.3 Emergency Commandeering Service

Provide momentary pressure "ON-OFF" key switch and indicator light at all landings. Provide indicator lights that automatically illuminate during emergency service. Key must be removable only when key is in "OFF" position. Provide in accordance with ASME A17.1.

D101002 1.6.4 Keys for Elevator Key Switches

Provide minimum of twelve keys per unique cylinder used on all key switches for single elevator.

D101002 1.7 MAINTENANCE AND DIAGNOSTIC COMPONENTS

D101002 1.7.1 Maintenance and Diagnostic Tools

Provide all special tools and software necessary to service and maintain each elevator; deliver at time of final acceptance. Provide one of each tool for each elevator machine room.

D101002 1.8 ADDITIONAL REQUIREMENTS FOR HYDRAULIC ELEVATORS

D101002 1.8.1 Hydraulic System

Provide hydraulic system which operates at a maximum working pressure of less than 500 psig.

a. Scavenger Pump Unit - Provide a scavenge oil reservoir, with strainer and transfer pump. Provide a manual-reset pit flood switch to prevent pump operation if pit is flooded. Anchor pump and oil reservoir to the pit floor.
b. Pressure Piping and Accessories - Provide ASTM A 53/A 53M or ASTM A 106/A 106M, Schedule 80, black steel piping with ASME B16.9 or ASME B16.11 fittings for supply piping. Provide welded or threaded forged pipe fittings that are located between the pump control valve body and the

cylinder inlet. Extend Schedule 80 piping from the pump control valve body, inside the pump unit, to the hydraulic cylinder in the hoistway. Provide dielectric union at each end of the "pump to cylinder" oil supply line. Provide hangers or supports for all piping.

c. Oil Temperature Device - Provide means to maintain oil temperature between 80 and 120 degrees F (27 and 49 degrees C) regardless of ambient temperature.

D101002 1.8.2 Cylinder-Plunger Unit

Provide a plunger of single-piece seamless steel construction. Provide threaded 1/4-inch (6 mm) bleeder valve at top of cylinder just below packing gland. Telescopic or inverted cylinder-plunger units are not acceptable. Provide cylinder with self-stabilizing mount that will support and hold cylinder plumb without the need for stabilization means at the bottom of the cylinder.

D101002 1.8.3 Automatic Shutoff Valve

Provide automatic shut-off valve in oil supply line as close to cylinder inlet as possible. Provide threaded pipe connections to the valve. Provide manual lowering feature on valve. Provide exposed adjustments of automatic shut-off valve with means of adjustment sealed by certified elevator inspector after being set to correct position and tested.

D101002 1.8.4 Well Casing

Line well with steel casing, minimum 1/4-inch (6 mm) wall with welded 1/2-inch (10 mm) steel bottom, set plumb. Install cylinder well casing plumb using spider bob method.

a. PVC Liner - Provide Schedule 80 PVC pipe liner with bottom cap and couplings; joints sealed watertight using PVC pipe manufacturer's recommended adhesive or heat welding methods. Provide liner inside diameter not less than 3-inch (76 mm) larger than elevator cylinder maximum outside diameter. Set PVC liner into well casing, centered and plumb. PVC liner may be provided as a manufacture’s applied liner or as a separate component.
b. Cylinder Installation - Install Cylinder plumb into PVC.
c. Cylinder Evacuation Tube - Provide a 3/4-inch (19 mm) PVC evacuation tube with strainer located within 6 inch (152 mm) of bottom of liner. Provide top of test tube with removable cap to exclude foreign matter.
d. Pressure Test - Test liner-cylinder assembly as a sealed unit. Provide safety relief valve set to relieve at 10 psig (69 kPag); 4.5 inch (114 mm) diameter dial pressure gage scaled for 0 to 50 psig (0 to 175 kPag) and calibrated to 0.5 percent accuracy; and an air pressure admission throttling and shutoff valve. Perform air pressure test in the presence of the Elevator Inspector. For safety, pressure test must only be performed when liner and cylinder are fully inserted and assembled in the well casing. Perform the test from remote location outside of

the elevator pit.

e. Secure cylinder/PVC liner assembly as recommended by cylinder manufacturer.

f. Seal - Seal gap between steel well casing and PVC liner with foam insert strong enough to retain and support final grouting. Provide 3000 psi (21 MPa) grout to a minimum of 4 inch (102 mm) thickness and level top of final grouting with pit floor.

g. Containment - Protect exposed portions of hydraulic elevator oil supply line that are installed below ground, including portions encapsulated in concrete, or covered by construction, with continuous Schedule 80 PVC containment.

h. Provide layout diagram, foundation support details, and foundation loads.

D101003 FREIGHT ELEVATORS

D101003 1.1 FREIGHT ELEVATOR REQUIRMENTS

Code compliance and all other general compliance items for freight elevators must be as for passenger elevators, except for such items deleted, altered or added to by the Project Program.

D101003 1.2 ADDITIONAL REQUIREMENTS FOR FREIGHT ELEVATORS

a. Guides - In addition to ASME A17.1, for freight elevators with greater than 10,000 pound (4545 Kg) capacity, slide guides are permitted in lieu of roller guides.

b. Horizontal Buck Board Wall Protection – Provide 2-1/2 inch (63 mm) thick (minimum) x 12 inch (304 mm) high (minimum) #2 oak protection boards on all side walls of the elevator at a height to prevent damage from fork lift traffic.

D101004 WHEELCHAIR LIFT

Comply with ASME A18.1, *Safety Standard for Platform Lifts and Stairway Chairlifts*.

D101005 DUMBWAITERS

Comply with ASME A17.1, *Code for Elevators and Escalators*.

D1020 WEIGHT HANDLING EQUIPMENT

Cranes and monorail systems must be designed, fabricated, assembled, shop tested, delivered, installed, inspected, field tested, and made ready for use in accordance with these RFP requirements, the applicable UFGS specification, the reference standards, and building codes. Build the crane or monorail system to the design drawings of a registered professional engineer. This PTS section is designed to provide requirements for all of the most commonly used building cranes types. Equipment provided must meet the paragraphs entitled BASIC REQUIREMENTS FOR CRANES AND MONORAIL WITH HOIST/TROLLEYS below, requirements of paragraphs entitled OVERHEAD CRANES for the crane type provided below, requirements of paragraphs entitled HOISTS for the hoist type provided as stated

below, and the applicable UFGS specification section.

D102001 BASIC REQUIREMENTS FOR CRANES OR MONORAILS WITH HOISTS/TROLLEYS

D102001 1.1 SAFETY

Comply with ARCHIVES AND RECORDS (NARA/ OSHA) 29 CFR, Part 1910.179, Overhead and Gantry Cranesand the mandatory (shall or must) and advisory (should) safety requirements of ASME B30.2, B30.11, B30.16 and B30.17, as applicable depending upon crane type.

D102001 1.2 MATERIALS

Provide material free from defects and imperfections that might affect the serviceability and appearance of the finished product. Provide new and unused materials that conform to the following standards.

a. Ductile Materials. All components directly supporting the load must be of ductile materials. These components include, but are not limited to all hoist drive gear reducer housings, motor frames and end bells (except for C-face mounted components of packaged hoists), flanged adapters, and brake wheels and discs. For the purposes of this specification ductile is defined as having a minimum elongation of 5% in 2 inches. Furthermore, provide all shafts, keys, gears, torque carrying coupling components, and wire rope drum of steel.
b. Structural Steel conforms to ASTM A36, A572 or A992.
c. Cast Steel conforms to ASTM A27 or ASTM A148.
d. Ductile Cast Iron conforms to ASTM A536.
e. Forged steel conforms to ASTM A668 or ASTM A521, grade as applicable.
f. Steel shafts conform to ASTM A434.
g. Aluminum castings conform to ASTM B26 or ASTM B108.
h. Welding materials for crane fabrication conform to AWS D14.1
i. Welding materials for the facility must conform to AWS D1.1.

D102001 1.3 TOLERANCES

Provide tolerances in accordance with the RFP requirements and the standards referenced herein.

D102001 1.4 OPERATING ENVIRONMENT

Provide pendant or radio controlled cranes and monorail systems designed to operate on electric or pneumatic or hand power as indicated in the Project Program. Design indoor equipment for an environment with an ambient temperature range of 40 Â°F to 105 Â°F. Design outdoor equipment for an environment typical of the installation location, including protection against adverse temperature, humidity, ultraviolet radiation, wet weather, salt air, corrosive atmosphere, and include

features necessary to prevent in-service or premature age related failure.

D102001 1.5 APPLICABLE DESIGN STANDARD

Design cranes and monorail systems in accordance with CMAA #70, CMAA #74, MH 27.1, 29 CFR 1910.179, 29 CFR 1910.306, paragraph (b), ASME B30.2, ASME B30.11, ASME B30.16, ASME B30.17, ASCE 7 and other requirements specified herein. Design packaged hoist in accordance with ASME HST. A packaged hoist is defined as a hoist where the components are mounted via c, d, or p-face flanges as opposed to base mounted. All packaged hoists must be produced by established manufacturers. Furnish and install runway electrification or air distribution system as well as runways for underhung cranes, monorails as part of this specification. Provide the hook work envelope to be the maximum practical consistent with good design.

Choose rated speed of all crane functions from the SLOW or MEDIUM speeds provided in CMAA 70 or CMAA 74 for the crane configuration and rated capacity and to agree with the Project Program stated end User requirements. Provide minimum function speeds to be 1/10 rated speeds.

D102001 1.6 COMPONENTS

A standard commercial product/assembly is defined as an item that is advertised for sale in current commercial literature and is being sold in substantial quantities on the open market in the course of normal business operations. Nominal quantities, as normally associated with models, samples, prototypes, or experimental units are not acceptable under this definition. The Contractor may utilize standard commercial products/assemblies in the design of the crane provided such components meet the requirements of this specification. Component selection must be substantiated by means of manufacturer's published ratings, selection method, or pro-rating. All components and assemblies furnished must be new and unused.

D102001 1.7 STRUCTURAL DESIGN

Structural design must conform to American Institute of Steel Construction (AISC) Steel Construction Manual, CMAA No. 70, CMAA No. 74 or MH27.1, 29 CFR Part 1910.179, ASME B30.2, 29 CRF Part 1910.23 and 1910.27, ASCE 7-05, and other requirements specified herein.

D102001 1.7.1 Space Envelope

Design cranes and monorail systems to operate in the space and match the runway dimensions indicated in building design drawings. Provide the maximum practical hook work envelope to be consistent with good design, but not less than indicated in the Project Program.

D102001 1.7.2 Structural Fastener Tightening

All bridge girder to end truck connection fasteners and any other fasteners critical to the structural integrity of the cranes must be installed and tightened in accordance with one of the methods

in the RCSC Specification for Structural Joints using High Strength Bolts.

D102001 1.7.3 Welding

All welding procedures, nondestructive testing requirements and welder qualifications must be in accordance with the requirements of AWS D14.1 for crane and monorail system fabrication and D1.1 for building interface welds.

D102001 1.7.4 Wheel Loads

Maximum wheel loads (without impact), as well as column loads and moments due to dead load and the rated capacity live loads, with the trolley in any position, must not cause greater shear or moment in runway girders and/or supporting structures than that produced by the design crane or monorail system load and spacing shown in the facility final design. Building designs/drawings will be provided to the Contractor for planning the design, shipping and erection of components.

D102001 1.7.5 Patented Track Monorail, Runway Systems and Bridge Girders

Provide monorails, underrunning runway systems and bridge girders for underrunning hoists with patented steel track, specially designed, fabricated and heat treated in accordance with MH 27.1, minimum Duty Service Classification C.

Utilize the runway or monorail (be supported from) the structural supports indicated on the facility final design. The track system and track suspension are the sole responsibility of the runway track supplier. However, design in accordance with the requirements of this RFP. Design and construct the suspension system to ensure no impairment of the strength of track or the structural support. Locate hanger or suspension at each track splice joint. Provide bracing to hold track sections in rigid alignment at all joints.

a. Sway Bracing - Brace track laterally and longitudinally to prevent damaging sway from loading conditions (dynamic, impact, seismic, etc).

b. Cataloged Products - If possible, provide track manufacturer's standard cataloged devices for connection of the track to the indicated supporting structures. If track manufacturer's cataloged devices are not provided for this suspension system, submit complete shop drawings and calculations for each custom suspension device for review and approval.

c. Suspension of Curves and Switches - Provide steel framing (structural supports), in addition to that indicated, as required by the track curve and switch manufacturer to support curves and switches. The additional steel framing must be the sole responsibility of the track supplier.

D102001 1.7.6 Wind Force Countermeasures for Outdoor Cranes

Provide wind brakes for each function (e.g. travel, trolley, rotate) of outdoor operating cranes where design calculations show that the function brake(s) are not sufficient to prevent inadvertent movement during crane operation in the event of worst case anticipated wind forces. Provide a securing method for each function (e.g. travel, trolley, rotate) of cranes stowed outdoors where design calculations show that the function brake(s) and additional wind brakes are not sufficient to prevent inadvertent movement during stowed condition in the event of worst case anticipated wind forces.

D102001 1.8 MECHANICAL DESIGN

The mechanical design of the cranes must conform to minimum of CMAA 70, Class C, MH 27.1, Duty Service Classification C, ASME B30.2, ASME B30.11, ASME B30.17 and other requirements specified herein. All drives which are not direct-connected with shafts in line must be driven through gears. Do not rely upon retaining rings for axial retention of sheave pins or bearings on pins and axles and they are permitted only on standard commercial assemblies. Do not rely on press fits for transmission of torque, except in travel drives. Cotter pins are permitted only for locking nuts to prevent loosening and for retaining pins in standard commercial brake assemblies. Conform enclosed gearing to ANSI/ AMERICAN GEAR MANUFACTURERS' ASSOCIATION (AGMA) 6013, 6034, or 6035, as permitted. Design open gearing in accordance with ANSI/AGMA 2001.

D102001 1.8.1 Design Factors

Design cranes and monorails using the following factors:

a. Compute stresses and ratings, except as modified herein, using the locked rotor torque or horsepower of the driving motor.

b. For wire rope drum and related component calculations, the line pull off the drum must be taken as that necessary to balance rated motor torque.

c. Design the hoist drive, except the wire rope, to withstand the setting of the hoist brake(s) under a full speed lowering condition with either no-load or rated load on the hook whichever load condition represents the worst case scenario.

d. Unless otherwise specified, design or select all mechanical components, including fasteners, to provide design factors of 4.0 and 5.0 based on material yield and ultimate tensile strengths respectively at rated load. Furthermore, except where stated otherwise, those components that are subjected to momentary peak loads (due to starting, braking, or locked rotor torque) must be designed to limit the peak stresses to 0.75 of the material yield strength, except that peak compressive stresses must be limited to 0.90 of the material yield strength.

e. Design the load suspension parts of hand chain operated hoists

including load chain so that the static stress calculated for the rated load do not exceed 25% of the minimum ultimate tensile strength.

f. Design shafts and axles subjected to reversing stresses for fatigue loading per CMAA #70, regardless of crane configuration. Do not consider shaft loading resulting from the setting of brakes in the fatigue evaluation.

D102001 1.8.2 Mechanical and Threaded Fasteners and Tightening

All fasteners used in securing mechanical or electrical-mechanical (i.e., brakes) components to their foundations must be tightened to accepted torque values from standard tables based on the lubricant used. The fasteners must be lubricated and not be installed "dry". Where self-locking nuts are used, the prevailing torque of the locking element must be accounted for. Nominally tighten all mechanical fasteners to 70% of the fastener yield strength, except in applications where component manufacturers prescribe specific fastener torque requirements.

Fasten all flange-mounted components and all mechanical connections subjected to calculable loads with SAE J429, Grade 5 or Grade 8 fasteners, ASTM F436 washers, and SAE J995 Grade 5 or Grade 8 nuts. Mounting fasteners from flange-mounted components, including keeper bars, may be installed into tapped holes provided that adequate thread engagement is provided to develop the full tensile strength of the fastener. Provide all nuts with a minimum of one thread pitch of the bolt protruding above the nut top surface. Size fastener connections neglecting any benefit from shear bars or dowel pins.

D102001 1.8.3 Hoist Load Chain or Wire Rope

Provide uncoated load chain. Provide uncoated wire rope that conforms to XIP or XXIP, 6x36, IWRC per ASTM 1023/A. Minimum design factor of 5 to 1 must be provided based on ratio of minimum chain or wire rope breaking force to the calculated load on the chain or wire rope when the hoist is assumed loaded to rated capacity. Certification from hoist manufacturer of provided chain's proof test at 150% of the hoist's rated load divided by the number of chain parts supporting the load for at least 10 minutes without deformation or wire rope's breaking force must be submitted to Contracting Officer and approved prior to final acceptance of hoist. Do not paint, galvanize or coat the load chain or wire rope. Wedge sockets are not permitted as terminal fittings on wire rope. Hoisting rope dead end connections to equalizer bar (if used) or hoist frame must be by means of poured socket connections or swaged fittings installed in a manner that develops the full breaking strength of the hoisting rope. Provide forged steel sockets. Anchor hoisting rope ends on the drum by means of swaged fittings or by clamping. Clamped hoisting rope ends must be neatly and securely seized with wire. Maintain a minimum of two full wraps of rope at the dead end(s) of the drum with the block in its lowest indicated position.

D102001 1.8.4 Load Block and Hook

Construct load blocks of steel. Design the load block to preclude the wire rope from being cut, pinched, crushed, or chafed in case of two-blocking or unloading of the wire rope. Construct load blocks so that hooks and hook nuts can be removed without re-reeving the hoist. Hooks must be able to rotate freely with 125% of rated load and employ a thrust bearing rated at no less than 150% of the rated load. Clearly mark hoist capacity in pounds on both sides of the load blocks.

Provide single barb forged carbon steel (conforming to ASTM A668 or ASTM A521 with a material longitudinal elongation of not less than 18% and a safety factor of no less than 5:1), swivel type hook in accordance with ASME B30.10. Proof test hooks in accordance with ASME B30.10 for a minimum of 10 minutes without deformation. Secure hook nuts to hooks by a commercial standard removable and reusable means (tack-welding is prohibited). Size hook throat opening for users' needs. Provide hook with spring loaded steel safety latch for closing the hook throat opening. Do not paint or coat the hook or hook nut. Permanently mark hook and hook nut with a unique identification number traceable to each other and to the NDT certification. Locate unique hook and nut markings to be visible when the hook and nut are assembled on the hook block. Mark in a low stress area using low stress marking methods.

D102001 1.8.5 Wire Rope Sheaves

Provide forged steel sheaves. The minimum pitch diameters of running and equalizer sheaves must be in accordance with HST-4 for packaged hoist. Do not paint contact surfaces of sheaves. Machine or grind the grooves to contour and rim toughen them to not less than 320 BHN. Sheave groove depth must not be less than 1.15 times the hoisting rope diameter. Mount all rotating sheaves on bearings.

D102001 1.8.6 Wire Rope Drum

The drum must be a one-piece steel weldment; finish-machined after all welding and stress relieving has been completed. Include in the drum integral stub shafts or shaft hubs for through shafts as required. Design the drum such that all hoisting rope is wound in a single layer. Do not mount drums in a 3 bearing configuration. Provide drums that are grooved, with grooves that are helical and machined right and left hand. Minimum drum groove depth must be .375 x rope diameter and drum groove pitch must be 1.14 x rope diameter or rope diameter plus 1/8 inch, whichever is smaller. Provide 18 times wire rope diameter for the minimum pitch diameter of drum.

D102001 1.8.7 Gearing

Provide enclosed (gear reducer) type gearing, except that the final drive may be open gearing. Do not use shafts with three or more bearing supports. Utilize standard commercial products for

gear reducers. Provide enclosed reducers with a convenient means of lubricant level indication, oil sampling and draining. Provide base mounted reducers with a ball valve for draining. Hoist gearing must be spur, helical, or herringbone type only, except for high speed gearing which must be helical or herringbone. Provide spur gears only on open type drum gear-pinion sets (if applicable). Travel drive gearing may be spur, helical, herringbone or spiral bevel. Shaft mounted gear reducers may be used for travel and trolley drives only. Torque arms must be other than threaded rod type and must be designed and installed so that no eccentric loads are imposed on them. Provide enclosed gearing that complies with ANSI/AGMA 6013, 6034, or 6035, as permitted. Design open gearing in accordance with ANSI/AGMA 2001. If the design uses a drum gear, fabricate the gear to be removable from the drum. Provide guards on all gearing not enclosed in gear cases that may constitute a hazard under normal operating conditions, and include guards with provisions for lubrication and inspection.

D102001 1.8.8 Hoist Brakes

See HOISTS, in this section for hoist brake requirements by hoist type.

D102001 1.8.9 Travel Brakes

Provide powered trolley and bridge drives with end mounted electro-mechanical or pneumatic brakes that are spring applied, electrically or air pressure released. Manual and push bridges and trolleys do not require braking. Travel brakes must have a torque rating of at least 50 percent for indoor cranes and have a torque rating of at least 100 percent for outdoor cranes. The torque setting must be adjustable. Provide brakes capable of stopping within a distance in feet equal to 10% of the rated speed in feet per minute when traveling at rated speed with rated load. Equip brakes with a manual self-return to ON brake release. Provide brake housings with easy access for wear and setting inspection.

D102001 1.8.10 Travel Drives

The bridge and trolley drives must be A-4 type.

D102001 1.8.11 Shafts, Axles, and Pins

All shafts, axles, and pins must be steel. Top running bridge and trolley axles must be of the rotating type.

D102001 1.8.12 Wheels

Underrunning wheels must be flanged. Provide double flanged for top running bridge and trolley wheels. All wheels must be straight tread and rolled to shape or roll forged to provide properties in congruence with ASTM A504. Do not make wheels by casting, fabrication from plate steel or hollow stamping. Rim toughen wheels that run on standard runway rails to not less than

320 BHN. Heat treat wheels that run on patented track beam to have minimum tread hardness of 375 BHN. Design bridge and trolley wheels to be compatible with their respective runway's profile. Provide wheel sizing and flange-to-rail head clearances in accordance with MH 27.1 and CMAA recommendations.

Equip bridge and trolley wheels of top running cranes and trolleys with rail sweeps. Provide a means to prevent bridge end truck and trolley from dropping more than one inch in case of wheel or axle failure.

D102001 1.8.13 Bumpers

Provide bumpers of the elastomeric, hydraulic or spring type on trolleys (or ends of bridge girders) and bridge end trucks. Design bumpers to withstand rated load at rated speed IAW AIST TR-6. Fully mate bumpers with the end stops and crane bumpers where applicable. Mount bumpers to provide proper clearance when bumpers are fully compressed. Where practical, mount bumpers to provide for easy removal of the travel wheels. Ensure trolley and bridge end truck frames are designed so that travel wheels do not contact the end stops. Design and install bumpers per the requirements of ASME B30 with a means of retaining the bumper in case of broken or loosened mounting connection(s).

D102001 1.8.14 Keys and Keyseats

Provide parallel type and machined key/keyseat assemblies. Install the key/ keyset assembly in a manner that preclude any possibility of a key shifting out of its intended position.

D102001 1.8.15 Fits

Interference fit all gears, pinions, couplings, brake drums, wire rope drums, wheels, other similar components to their respective shaft or axle. Interference fits must conform to the force fit requirements prescribed in ANSI B4.1 and must be medium drive fits unless length of engagement, material, or loading indicates otherwise. Alternatively, in bridge and trolley drives, keyless hub-to-shaft connections must be permitted where minimum potential interface fits capable of transmitting maximum torque (not less than 200% rated motor torque) is provided. The individual component manufacturers must endorse these interference fits. Fit bearings, bushings, and seals in accordance with the manufacturer's recommendations. Where multiple interference fitted components are installed on a single shaft from the same end, there must be clearance between each component's bore and the portion of the shaft from the installation end up to its mounting location. Fits of components within standard commercial assemblies, such as gear reducers and electric motors, must comply with the applicable industry standards or with the manufacturer's standard practice if industry standard criteria are not available.

D102001 1.8.16 Bearings

Provide anti-friction type bearings, except those subject to a small rocker motion. Use permanently lubricated sealed bearings wherever practical. Provide an easily accessible means of lubrication for bearings not considered lifetime lubricated by the manufacturer. Supply inner races for all antifriction bearings, except that bearings without inner races are permitted as part of packaged hoist unit. If a pedestal bearing is used to support the drum, the bearing housing must be steel.

D102001 1.8.17 Bushings and Thrust Washers

Fit all connections, including equalizer sheaves or bars, subject only to small rocking motion with bronze bushings and/or thrust washers, as applicable. Groove bushings to distribute lubricant.

D102001 1.8.18 Painting of System

Protect all parts of the cranes against corrosion. Clean, prime, and finish paint all surfaces normally painted at the Contractor's plant as specified hereinafter. Do not paint, coat, or galvanize the following surfaces: load chain, hoisting rope, load hook, suspension hook, load hook nut, suspension hook nut, load chain sheave (sprocket), wire rope contact areas of sheaves and drum, trolley and travel wheel treads, gear teeth, load bearing surfaces of travel rails, machined surfaces that are bearing surfaces, lubrication fittings, corrosion resistant steel, bronze, anodized aluminum, name plates, flange mounting faces, other items not normally painted, and wheel tread contact surfaces of runway beams. Provide painting systems and scheme as follows:

a. Paint Systems. Provide primer coat and the finish coat of paint that is smooth, even and free of runs, sags, orange peel, or other defects. Take precautions to avoid painting surfaces specified as non-painted. Any painted over grease fittings must be replaced; they may not be cleaned and reused. Provide a painting system that consists of anti-corrosive primer and topcoat(s) appropriate for the intended environmental conditions. The primer and topcoat(s) must be compatible with each other, the substrate, and be products of the same manufacturer. Apply primer and topcoat(s) in accordance with the manufacturer's recommended process. The use of paint containing lead or mercury is prohibited. Identify the primer and finish coats in the technical manual or drawings.

b. Painting Scheme. The painting scheme is as follows:

(1) Paint crane structural beams, hook block, and end trucks brilliant yellow.

(2) Paint sides of hook blocks to have additional gloss black diagonal safety striping.

(3) Paint faying surfaces of slip-critical structural bolted connections, both interior and exterior, with coatings as specified in RCSC Specification for Structural Joints Using High

Strength Bolts".

(4) Clean and repaint any painted surfaces damaged during erection.

(5) Paint other components not specified above. The color and coating may be in accordance with the component manufacturer's standards.

D102001 1.8.19 Identification Plates

Provide two capacity plates with permanent lettering, one for each side of the bridge, monorail. Indicate the rated hoisting capacity of the hook in pound units on the plates and securely attach each plate. Size lettering to be easily read from the floor. Beneath the rated capacity the following information must be included:

Naval Facilities Engineering Command

Contract Number

Manufacturer's name, address, crane model number and crane serial number

Voltage of AC or DC power supply, and phase and frequency of AC power supply, if applicable.

D102001 1.8.20 Direction Identification

Provide cardinal direction indication letters centered on the bottom of each trolley where space permits. Denote North, South, East, and West and reflect the travel directions given on the controller. Size lettering to be easily read from the floor.

D102001 1.8.21 Unique Identifier Tag

In accordance with FEDERAL ACQUISITION REGULATIONS (FAR) 252.211-7003, assign a unique identifier to the crane. Attach the Unique Identification Tag to the outside of the main electrical disconnect panel.

D102001 1.9 ELECTRICAL DESIGN

Electrical design must conform to CMAA #70, CMAA #74, MH 27.1, ASME B30.2, ASME B30.16, as applicable, NFPA 70, NATIONAL ELECTRICAL MANUFACTURERS' ASSOCIATION (NEMA) ICS 7, NEMA ICS 8, and other requirements specified herein. Each drive mechanism must be provided with a separate and independent drive unit with a circuit breaker branch circuit protection device capable of being locked in the open position. Design the electrical system to allow simultaneous motions of the main hoist and all traversing functions, and ancillary loads. Design the crane to operate on the designated power supply.

Provide disconnecting means for cranes and monorail hoists in accordance with NEC 610.32. Disconnecting means provided for cranes

must be a lever arm type switch (rotary type switches are not acceptable) located in a separate enclosure on the crane. Configure crane disconnects such that when the disconnect is secured, there are no energized conductors in any associated control panels.

Provide a separate runway disconnecting means in accordance with NEC 610.31. Runway disconnect switches for runways or monorails longer than 50 feet must be at the midpoint of the runway as much as possible.

Feed all control circuits from a single phase, air cooled, double-wound transformer. Furnish and install all electric drive equipment on the crane, including motors, brakes, switches, controllers, panels, items associated with the pendant, wiring system, cables, and electrification. All contactors and relays must have appropriate MOVs or R-C surge absorbers installed across the respective device's coil. Do not mix power and control cables in the same conduit in order to prevent interference where feasible.

D102001 1.9.1 Electrical Assembly

Install electrical wiring, conduit, and components in accordance with the requirements of NFPA 70. As a minimum, comply with the following items:

a. Install all electrical connections in accordance with NFPA 70 sections 110.14 or 430.9, as applicable, or as recommended by the device manufacturer.

b. If used, properly size crimped terminal lugs for the wire and install using the device(s) - e.g., crimping tool and indenter - recommended by the terminal lug manufacturer.

c. Identify all spare conductors, and insulate their ends to preclude accidental contact with energized equipment.

d. Adhesive-backed wiring tie wraps and cable-clamping devices cannot be used unless they are secured with fasteners, in addition to the adhesive.

e. Bond all panel doors, back sheets, and panel boards with flexible bonding straps.

f. Remove paint from termination points, or install "cut" washers to insure proper grounding of equipment at bonding straps and equipment grounding conductors.

g. Wrap wiring around sharp edges, such as panel doors, to protect sleeves (e.g., "spiral wrap") and prevent wiring insulation damage from chafing, cutting or abrasion.

h. Control panels cannot be used as raceways for conductors not terminating within the panel.

i. Use bushings or chafing protection gear on all panel conduit entries.

j. Mount only equipment that needs to be viewed or accessed from the panel door (i.e. dataloggers, key switches, pilot lights, etc.) on the panel door.

k. Tie wraps are prohibited as a permanent mounting means on festoon loops.

l. Flexible metal conduit may be used in lieu of ferrous rigid metal conduit for lengths of three feet or less when flexible connections are needed for motors and lighting.

m. Excluding conduit directly connected to dynamic breaking resistors, raceways must maintain a 12-inch clearance between the raceway and dynamic braking resistors.

n. Route a separate grounding wire, sized in accordance with Section 250-122 of NFPA 70, with all ungrounded conductors.

o. Number or tag all wiring at all connection points.

p. Label power conductors which are shielded as to the conductor size.

q. Plug all unused conduit openings.

r. Terminate all conductors on terminal blocks; splices are not acceptable, with the following exceptions:

(1) Motor and brake connections may be made using split-bolts or lugged and connected with nuts, bolts, flat washers and lock washers in lieu of installing a terminal block in the motor connection box.

(2) Wire-nuts are not permitted except where making connections for lighting ballasts. Secure wire nut connections such that during operation of the crane they will not loosen.

(3) Provide encoder conductors with a continuous run from the encoder to the drive. Use fiber optic cable if the length of cable required between a drive and its respective encoder is longer than 150 feet.

(4) Wire terminals with more than one wire must be rated by the manufacturer for use with multiple wires.

D102001 1.9.2 Enclosures

Provide enclosures for control panels and auxiliary devices in accordance with Underwriters Laboratories (UL) or CSA listed metallic NEMA type 12 for indoor cranes or NEMA Type 4X stainless steel for all outdoor cranes as defined by NEMA Standards Publication Number 250. Design enclosures with appropriate heating and/or cooling accessories to maintain a climate within the panel that provides an appropriate internal temperature environment for proper operation of the drives. Condensation

inside the control panels is not acceptable. Provide industrial grade electrical components and located so they are easily accessible for inspection and maintenance.

D102001 1.9.3 Wiring System

Unless otherwise specified, provide interconnecting wiring of copper stranded construction complying with Table 310-13 of NFPA 70. Aluminum conductors are prohibited. Aluminum connectors are allowed if they are rated for use with copper conductors (marked AL/CU). All conductors connected to or routed above resistors must have at least 8 inches clearance, with the exception of type SA and FEPB insulation shown in NFPA 70 (National Electric Code (NEC)) Table 610-14(a) for 125Â°C maximum temperature. Size motor branch circuit conductors to have an ampacity not less than 150% of the motor full load current rating and to be no smaller than 12 AWG. Conductors must be selected and de-rated based on maximum ambient temperature. Continuous loads such as utility, heating, lighting, and air conditioning must be multiplied by 2.25 to determine ampacity in order to permit application of NFPA 70 NEC 610-14 (e) for crane supply conductors. Provide raceways of ferrous rigid metal conduit.

D102001 1.9.4 Drive Mechanism Electric Motors

Provide electric drive mechanism motors that conform to NEMA MG 1. Hoist, bridge and trolley drive motors must be AC inverter duty, totally enclosed non-ventilated (TENV) or totally enclosed fan cooled (TEFC), squirrel cage induction type. All motors must have a 60-minute duty rating minimum. Provide motor insulation of a minimum of Class F, but with a Class B temperature rise. Furnish motors located outdoors with anti-condensation heaters.

Equip motors with thermal trip type over-temperature protection. Provide automatic resetting type temperature sensors installed integral to the motor windings. Activation of any integral motor over-temperature device energizes a red indicating FAULT light mounted on the crane and de-energizes the individual function as follows:

a. Hoists: hoisting direction only

b. Traverse Functions: motion in either direction.

The red indicating fault light remains energized until the over-temperature device resets.

D102001 1.9.5 Hoist, Trolley, Bridge Electric Controls

Comply with the following hoist, trolley and bridge controls requirements:

a. Provide static reversing, adjustable frequency controllers for all functions. Provide all controllers with a keypad or other interface allowing the end user to view/change parameters

and view drive faults. Hoist drives are required to be selected such that the continuous rating of the controller is not less than 130% of the calculated motor full load current based on CMAA #70 paragraph 5.2.9.1.1.1, regardless of crane configuration, NFPA 70 NEC Table 430.250, and NEMA ICS7. Equip all hoist drives with a motor overtorque limit to lock out the hoist and prevent gross overload of the associated hoist. Set the overtorque limit such that an overload test can be performed without tripping the overtorque fault. All controllers must be from the same manufacturer. Each electric drive requires dynamic braking. Provide infinitely variable type speed control for each function. Design controls such that the maximum speed of each function is limited to 25% of rated speed when a slow speed switch is actuated on the operator's controller. Energize a yellow/amber light mounted on the crane while in slow speed mode.

b. Set all function brakes only after the associated controller decelerates the drive motor to a controlled stop. Size all controllers to provide sufficient starting torque to initiate motion of that crane drive mechanism from standstill with 0 to 125% of rated load on the hook and not produce any rollback. The hoist controller must enable the drive motor to develop full torque continuously at zero speed. Motors must operate smoothly at all speeds without torque pulsations, and only be energized within the frequency range of 50-60 Hz at rated speed. With respect to AC control wiring, no neutral wire must pass through the contacts of a control relay or contactor, i.e., a device must not be shut off or disengaged by breaking the device's neutral conductor.

D102001 1.9.6 Transients and Harmonic Protection

Provide varistors for transient protection internal to the controller. Minimum harmonics protection must consist of a reactor connected in series with each controller's line (input) terminals. Rate all reactors for continuous duty operation based upon motor nameplate amperes and design for 60 HZ operation. For a drive motor branch circuit that exceeds 100 feet in length, connect a reactor in series with the controller load (output) terminals to provide standing wave protection.

D102001 1.9.7 Drive Faults

Energize a red indicating FAULT light visible to the operator for drive faults.

D102001 1.9.8 Brake Controls

Release each drive mechanism's electro-mechanical brake only upon movement of the electric drive's controller from the OFF position and verification of motor torque, and set only after the electric drive's controller is returned to the OFF position and motors have regeneratively slowed to a controlled stop.

D102001 1.9.9 Main Line Contactors

Provide a main line contactor. Control energization of the main line contactor by a POWER-OFF/POWER-ON pushbutton on the control station. Except for the POWER OFF-POWER ON circuit, the control circuit including directional contactors must not be energized without energization of the mainline contactor. Provide black POWER-ON pushbutton and equipped with a guard to prevent accidental actuation. Provide red POWER -OFF mushroom-head pushbutton with no guard for quick and easy access.

D102001 1.9.10 Electrical Overload Protection

Protection must not be less than required by NEMA ICS 8, CMAA #70, MH 27.1, and NFPA 70. Use circuit breakers or fuses for protection. Individually protect motor branch circuits by circuit breakers capable of being locked in the open position to isolate that function without use of a portable lockout device. Calculate the circuit breaker size using the motor full load current from NEC 430, Part XIV (Tables).

D102001 1.9.11 Operator Controls

Comply with the following operator control requirements:

a. Control cranes from a radio control station where permitted, or pendant pushbutton station if radio frequency control is not desired (see project program for control configuration). Legibly mark and arrange operator controllers in accordance with ASME B30 guidance, except label traverse functions of bridge cranes with ordinal directions (NORTH, SOUTH, EAST, WEST) to agree with direction labels on the cranes. Provide all pushbuttons and levers with spring returns to the OFF position upon operator's release. Also provide a maintained two-position selector switch for slow speed selection and an ON/OFF switch for flood lights, if equipped. Equip operator stations to accept keys enabling a user to lock out the station from use.

b. Suspend pendant pushbutton stations by a 1/8 inch minimum stainless steel wire rope strain lead from an independent festoon system. Provide strain relief hardware consisting of a stainless steel wire mesh cable grip. The pendant pushbutton station must be a rubber molded enclosure. Provide pendant cable of type SOO.

c. Include an identical back-up transmitter unit for each radio control system. Provide portable transmitters that weigh not more than eight pounds each (including the batteries and antenna), with an adjustable belt or harness to support it when worn by the operator. Ensure that only one transmitter at a time can control the crane and assure interference from one crane's controller does not affect operation of the other cranes in the building. Each transmitter includes: individual spring return joystick motion control levers for each function; a maintained contact, keyed switch, marked ON-OFF, for portable transmitter unit power; one or more LEDs indicating POWER ON, TRANSMITTING and LOW BATTERY; a red emergency STOP mushroom pushbutton; a 25% speed selector switch; a maintained switch to control the floodlights (if equipped); and a separate auxiliary pushbutton for a crane

warning device (horn).

d. Design the remote radio control system to meet the requirements of NEMA ICS 8, Part 9. Each radio remote control lever must be in the OFF position before the associated crane function can begin. Choose the system frequency to be within the unlicensed FCC Part 15 range, unless licensed frequency is required by the end User. Maintain a continuous status signal between each control unit and the associated receiver. Provide a contact monitoring board with each crane radio system receiver.

e. Use rechargeable type batteries in the radio transmitter. Provide a minimum of three sets of batteries (one for each transmitter plus one on recharge). There must be no significant loss in systems efficiency and function at the end of eight hours of continuous battery use. Provide a battery charger.

D102001 1.9.12 Pendant Conductor System

Operate the pendant controller on its own independent festoon system. The festoon cables must consist of flat cables suspended from carriers riding on a rigid I-beam or similar type beam. The pendant controller must be capable of traveling the entire length of the bridge. Festoon loops must not extend below the high hook position. Provide at least 20% of the conductors to be spare at the time of crane acceptance. Pendant festoon systems must move independently of the trolley.

D102001 1.9.13 Indicator Lights and Warning Devices

Comply with indicator lights and warning device requirements as follows:

a. Install indicator lights and beacons with LED type lights sized to be visible from the operator's location. Provide a white light to indicate that power is available on the load side of the crane disconnect, a blue light to indicate that the main line contactor is energized, a yellow/amber slow speed light, and a red fault warning light to indicate a drive fault or motor over-temperature. Design light to use 115 VAC voltage. Provide nameplates with lettering of sufficient size to be easily read from the floor. The nameplates must read in their respective order "POWER AVAILABLE", "POWER ON", "SLOW SPEED", and "FAULT".

b. Install a lamp test pushbutton on the outside of the control panel to allow for simultaneously energizing all lights in this section for testing purposes.

c. Provide a wind indicating device for outdoor cranes. This device must either provide a visible or audible alarm to the crane operator(s) when the wind velocity exceeds a preset limit. Assure that the chosen device does not conflict with any other previously listed indication/warning.

D102001 1.9.14 Overtravel Limit Switches

Comply with the overtravel limit switch requirements as follows:

a. See requirements in paragraph entitled HOIST for numbers and types of overtravel limit switches required by hoist type.

b. Hoist Limit Switch Settings. Set each primary upper limit switch at the maximum practical hook height but not lower than high hook position. Set the secondary upper limit switch not lower than the hook height of the primary upper limit switch setting plus the primary runout distance, but not less than the secondary runout distance below the lowest contact point of the hoist or trolley structure (two-block condition). (The runout distances are defined as the load block maximum drift, after switch activation, in the hoisting direction at rated speed with no load on the hook. Primary and secondary runout distances are associated with the primary and secondary upper limit switches, respectively.)

c. Hoist Slow-Down Limit Switches. Slow down limit switches may be used, set below the primary upper limit switch, to automatically decrease the hoisting speed to a predetermined slow speed before tripping the primary upper limit switch. The runout distances would then be defined as the load block maximum drift, after slow down switch activation, in the hoisting direction at slow speed with no load on the hook.

D102001 1.9.15 Runway Electrification

Comply with the following runway electrification requirements

a. Provide a runway electrification system to power the crane and connect it to the crane runway disconnect. Refer to the facility final design for the length of the system. Runway electrification for crane must be of the flat festooned type or enclosed safety bar type (see project program) with four continuous copper conductors. Ground the crane through the runway electrification system. Provide electrical work in accordance with Section D50, *Electrical*.

b. Rigid runway electrification systems must include all necessary hardware to the crane or monorail system from a wall or column mounted disconnect switch. Provide discreet rail type rigid runway electrification systems such that sections can be easily replaced if damaged and have insulating covers. Make outdoor rigid runway electrification systems with stainless steel or be coated specifically to prevent corrosion and use UV resistant insulating covers. Design rigid runway electrification systems for a dusty environment, consisting of three power conductors and an equipment grounding conductor. Color the ground runway conductor green, if individual conductor bars are used (not a 4-conductor system).

c. For overhead cranes, install a guard if normal crane operations could result in the hook block or wire rope contacting the conductors.

d. Provide heavy duty sliding shoe type design for collectors and specifically design to match conductor contact surface. Collector arms must be insulated, spring loaded and must permit sufficient lateral and vertical movement to allow for imperfect track and for misalignment relative to the crane. Provide two collector shoes (tandem design) for each conductor; each collector shoe to be rated for its branch circuit current, or higher so as to provide redundancy.

e. Utilize flat cables suspended from carriers riding on an I-beam or C-track for festooned type electrification systems. Select the conductors so as to be of the longest length without splices. Fabricate conductors from copper. Provide a minimum of 20% of the festoon control circuit conductors for each electrification system to be spares at the time of crane acceptance. Festooned cable loops must not extend below the high hook position. Provide UL or CSA listed materials.

f. Size runway conductors for simultaneous motions of the main hoist plus all traverse crane functions plus any ancillary loads. When more than one crane makes use of the same runway electrification, size the system to accommodate simultaneous operations of the main hoist plus all traverse functions of all cranes at once.

D102001 1.9.16 Bridge-to-Trolley Electrification

Utilize flat cables suspended from carriers riding on an I-beam or C-track for festooned type electrification systems from bridge-to-trolley. Select the conductors so as to be of the longest length without splices. Fabricate conductors from copper. Provide a minimum of 20% of the festoon control circuit conductors for each electrification system to be spares at the time of crane acceptance. Electrically powered trolleys are required to be grounded through this conductor system. Festooned cable loops must not extend below the high hook position. Provide UL or CSA listed materials.

D102001 1.9.17 Nameplates

Provide nameplates for all electrical control equipment such as contactors, relays, transformers, etc., and all electrical panels. As a minimum, identify the associated function and system designation on each nameplate. Retain all electrical component nameplates, markings, etc. provided by the original manufacturer.

D102001 1.9.18 Electrical Outlets

For cranes with maintenance walkways, provide a minimum of one 120 VAC duplex outlet on the crane. Mount the outlet on the outside of the control panel(s). Incorporate ground-fault circuit-interrupter protection and a circuit breaker with a minimum rating of 15 amps for protection of circuit supplying receptacles.

D102001 1.9.19 Flood Lights

Provide flood lights where the crane, hoist or trolley cast a shadow on workstations. Select flood lights to match the building lighting color and intensity. Evenly space the light bulbs along the crane to provide a minimum illumination level of 50 foot-candles at three feet above the finished floor. Provide all light fixtures rated for rough service, vibration resistant, and designed to prevent any material from falling from the fixture. Equip the lights with safety cables to prevent the fixtures from falling to the floor if dropped while being serviced. For cranes with maintenance walkways, locate the lights to be serviceable from the walkway(s). Provide a switch on the operator's controller to operate the floodlights.

D102001 1.9.20 Capacity Overload Protection

Provide overload limiting for each hoist motor circuit separate from the hoist drive overtorque limit specified in paragraph above entitled HOIST, TROLLEY, BRIDGE CONTROLS. The device must have a maintained keyed override located on the control panel that can be deactivated during overload testing. When an overload is detected limit the hoist function to the lowering direction only. Resetting of the overload must only be accomplished by moving the hoist in the down direction or by cycling power. Initially set the overload limit at 100% and ensure that it is adjustable from 80% to 150% of rated capacity.

D102001 1.9.21 Hour Meter

Provide a non-resettable hour meter, connected across the main line contactor, readable from the exterior of the main control panel, to indicate the elapsed number of hours the crane is energized. Additionally, provide non-resettable hour meters for each function, readable from the exterior of the main control panel, connected to each function's brake contactors to indicate the running time of each individual function.

D102001 1.10 PNEUMATIC DESIGN

Pneumatic design must conform to CMAA #70, MH 27.1, ASME B30.2, ASME B30.16, ASME HST-5, ASME HST-6 as applicable, and other requirements specified herein. The pneumatic power for the crane must be fed from a junction with a quarter-turn to off valve, accessible to the crane or monorail system operator, capable of being locked in the off position. Disconnect valves for runways or monorails longer than 50 feet must be at the midpoint of the runway as much as possible. The pneumatic supply system must have capacity to allow simultaneous motions of all hoisting and traversing functions. Design the crane to operate on the designated pressure and flow rate. Configure disconnect valves such that when a valve is secured, there are no other sources of air supply to any part of the crane.

D102001 1.10.1 Pneumatic Assembly

Perform Installation of all pneumatic piping and components as

stated below:

a. Install all pneumatic piping and connections as recommended by the device manufacturer.

b. Use rigid metal piping of the correct pressure rating for all piping runs. Flexible lines may be used in lieu of rigid metal piping for lengths of three feet or less when flexible connections are needed between components. Flexible lines must be rated for the system pressure.

c. Number or tag piping at all connection points.

d. Pressure test piping runs to ensure that they are free of leaks prior to connection to cranes.

e. Provide system fittings, piping and connectors exposed to the outdoor environment of corrosion resistant material.

D102001 1.10.2 Drive Mechanism Pneumatic Motors

Provide pneumatic drive mechanism motors with adequate power and starting torque and operate without perceptible vibration at any of the hoist loads or speeds within the rated load and speed capacity. The hoist motor may be either axial piston or rotary vane type.

D102001 1.10.3 Overload Protection

Equip the hoist with overload protection to prevent gross overload and any resulting damage to the crane or monorail system. The device must allow load testing at up to 125% of rated capacity. If adjustable, initially set the overload limit at 100% of rated capacity. Limit hoist operation to the lowering direction only when an overload occurs.

D102001 1.10.4 Operator Controls

Comply with the following operator control requirements:

a. Provide an operator station suspended from the hoist/trolley unit. Pull cord or rod controls are not desired. Legibly mark and arrange control stations functions in accordance with ASME B30 guidance, except that traverse functions of OETs are labeled with ordinal directions (NORTH, SOUTH, EAST, WEST) to agree with direction labels on the cranes. Spring return all levers to the OFF position upon operator's release.

b. Suspend operator station by a 1/8 inch minimum stainless steel wire rope from the hoist/trolley unit structure.

D102001 1.10.5 Overtravel Limit Switches

Provide a lift limiting device so that the load hook, either loaded or empty, at any operating speed, will not allow the load block to contact the hoist frame. Install a stop or other device

to prevent the load hook from being lowered beyond the hoist design limit of travel.

D102001 1.10.6 Runway Air Supply

Comply with the following runway air supply requirements:

a. Provide a runway air supply system, including retractable hose reel, to power the crane and connect it to the crane runway disconnect. Refer to the Project Program for the operating length of the system.

b. Pneumatic supply emergency shut-off devices must be readily accessible from the floor, and located within proximity to the crane runway, monorail track system.

c. Size runway air supply piping for simultaneous motions of all crane functions plus any ancillary loads. When more than one crane makes use of the same runway air supply, size the system to accommodate simultaneous operations of all functions of all cranes at once.

D102001 1.10.7 Nameplates

Provide nameplates for all pneumatic control equipment. As a minimum, identify the associated functions and system designations on each nameplate. Retain all pneumatic component nameplates, markings, etc. provided by the original manufacturer.

D102001 1.10.8 Hour Meter

Provide a non-resettable meter in the air supply calibrated to indicate the elapsed number of hours the crane is operating.

D102001 1.10.9 Pressure and Flow Regulation

Provide a device to limit inlet pressure and air flow in line between the air supply and the crane air inlet, mounted at the level of the hoist. The device(s) must ensure pressure does not exceed the rated pressure at the hoist and that the crane or monorail system functions at the desired speed and capacities. The device must allow sufficient air flow and pressure to operate the brake release mechanism.

D102001 1.10.10 Moisture Separator/ Oiler

Provide a device in the supply line to the crane or monorail to remove moisture and add lubrication to the incoming air supply.

D102002 OVERHEAD CRANES

In accordance with the project program, provide an overhead top running multiple girder bridge cranes, single girder top running bridge crane, single girder underrunning bridge crane, monorail system, or hoist with the required equipment quantity, span, runway length, capacity and hook height needed to fulfill the mission of the end user.

D102002 1.1 TOPRUNNING MULTIPLE GIRDER CRANE

Provide a top running multiple girder crane with hoist and trolley complete, tested and ready for operation. The crane, hoist and trolley must be electrically, pneumatically or manually powered in compliance with the Project Program. Crane, hoist, trolley, equipment, materials, installation, examination, inspection, and workmanship must meet the applicable requirements of ASME B30.2 and CMAA 70, Class C minimum, as modified and supplemented by this specification. Provide the following girder crane components in addition to the general requirements of the paragraphs entitled BASIC REQUIREMENTS FOR CRANES OR MONORAILS WITH HOISTS/TROLLEYS above.

D102002 1.1.1 Bridge Girders

Provide welded box section type bridge girders for spans greater than 40 feet. For spans less than 40 feet, open web girders may be used. Minimize splices in the bridge girder and avoid splices in locations of high stress. Provide full penetration welds at splices. Design bridge girders to be end notched to fit over the end truck.

D102002 1.1.2 Bridge Rails

Select bridge rails from the sizes listed in CMAA #70, Table 4.13.3-4; do not use solid stock material (square, round or rectangular) for bridge rails. Select the rails so that the allowable wheel loads are not exceeded by the design rated load on the hoist. Attach the rails to the bridge girders with pairs of adjustable rail clips spaced not more than 36 inches apart designed per the wheel loading design. Secure the rail clips to the top flange of the bridge girder by welding. If rail joints cannot be avoided due to the length of the span, the joints must be staggered and located directly over girder diaphragms. Provide rail joint gaps less than 1/32 of an inch. Weld creep bars in place at each end of the rail. Locate bridge rails above the shear center of the girder.

D102002 1.1.3 Walkways

Where necessary to access maintainable features, provide full length maintenance walkways on both girders with crossovers at the end trucks to allow movement between girders. At least one walkway must have a means of boarding the crane and must match the elevation and position of the access platforms located in the building.

D102002 1.1.4 Hoist and Trolley

Provide electric, air-powered, or manual hoist and trolley in compliance with the general requirements of paragraphs entitled BASIC REQUIREMENTS FOR CRANES OR MONORAILS WITH HOISTS/TROLLEYS above and the specific requirements of HOISTS below.

D102002 1.1.5 Bridge and Trolley End Trucks

Provide end trucks of box section design with wheels centered between the webs. Commercially available end trucks that are not box section may be used for bridge spans less than 40 feet. Equip end trucks for the bridge and trolley with rail sweeps that conform to ASME B30.2 extending below the rail head designed to move an obstruction.

D102002 1.1.6 Drop Lugs

Provide safety lugs or drop lugs to prevent bridge and trolley end trucks from dropping more than one inch or derailing in the event of wheel or axle failure.

D102002 1.1.7 End Stops

Provide end stops on the building runway and bridge girders designed and installed in accordance with AIST TR-13 to resist crane bumper and trolley bumper dynamic forces specified in AIST TR-6. Do not bolt end stops to the bridge rails.

D102002 1.1.8 Major Component Attachments for Lifting and Handling

Design and fabricate major components (e.g. bridge girders, end trucks, and trolleys) with structural or mechanical attachment points (lifting lugs, safety hoist rings, hoist rings or approved equivalent) when they are to be lifted or handled by suspended rigging.

D102002 1.2 TOP RUNNING BRIDGE, UNDERRUNNING HOIST SINGLE GIRDER CRANE

Provide a top running bridge, underrunning hoist/trolley crane with hoist and trolley complete, tested and ready for operation. The crane, hoist and trolley must be electrically, pneumatically or manually powered in compliance with the Project Program. Crane, hoist, trolley, equipment, materials, design, installation, examination, inspection, and workmanship must be in accordance with the applicable requirements, ("shall" or "must" statements) and recommendations ("should" statements), ASME B30.17, and MH 27.1, Duty Class C, as modified and supplemented by this specification. Provide the following bridge/ girder crane components in addition to the general requirements of the paragraphs entitled BASIC REQUIREMENTS FOR CRANES OR MONORAILS WITH HOISTS/TROLLEYS above.

D102002 1.2.1 Bridge Girder

Provide bridge girders for single girder cranes not to exceed 50 feet in any single span. Provide a bridge girder of specially designed trackage in accordance with MH 27.1 Duty Class C, e.g., patented track beam constructed from welded steel components. Minimize splices in the bridge girder and avoid splices in locations of high stress. Provide full penetration welds at splices. Design bridge girders to be end notched to fit over the end truck.

D102002 1.2.2 Hoist and Trolley

Provide electric, air-powered, or manual hoist and trolley in compliance with the general requirements of the paragraphs entitled BASIC REQUIREMENTS FOR CRANES OR MONORAILS WITH HOISTS/TROLLEYS above and the specific requirements of HOISTS below.

D102002 1.2.3 Bridge End Trucks

Provide end trucks of box section design with wheels centered between the webs except that commercially available end trucks that are not box section may be used for bridge spans less than 40 feet. Equip end trucks with rail sweeps that conform to ASME B30.17 extending below the rail head designed to move an obstruction.

D102002 1.2.4 Drop Lugs

Provide safety lugs or drop lugs or a functionally equivalent feature on the trolley frame and end truck frames to prevent a drop of more than one inch in the event of wheel or axle failure.

D102002 1.2.5 Trolley Stops

Provide extended wrap-around trolley frame plates or similar to contact the end stops. The trolley wheels must not contact the end stops.

D102002 1.2.6 End Stops

Provide end stops on the bridge runway designed and installed in accordance with AIST TR-13 to resist crane bumper dynamic forces specified in AIST TR-6. Trolley end stops may be the standard product of the bridge girder manufacturer.

D102002 1.2.7 Major Components Attachments for Lifting and Handling

Design and fabricate major components (e.g. bridge girders, end trucks, and trolleys) with structural or mechanical attachment points (lifting lugs, safety hoist rings, hoist rings or approved equivalent) when they are to be lifted or handled by suspended rigging

D102002 1.3 UNDERRUNNING BRIDGE, UNDERUNNING HOIST, SINGLE GIRDER CRANE

Provide an underrunning single girder bridge crane with underrunning hoist and trolley complete, tested and ready for operation. The crane, hoist and trolley must be electrically, pneumatically or manually powered in compliance with the Project Program. Crane, hoist, trolley (carrier), end trucks, equipment, materials, installation, examination, inspection, and workmanship must be in accordance with the applicable requirements of ASME B30.11, and MH 27.1, Duty Class C, as modified and supplemented by this specification. Crane girder and runway tracks must be patented track. Provide the following bridge/girder crane components in addition to the general requirements in the paragraphs entitled BASIC REQUIREMENTS FOR CRANES OR MONORAILS WITH HOISTS/TROLLEYS components above.

D102002 1.3.1 Bridge Girder

Provide bridge girders for single girder cranes not exceed 50 feet (except top running multiple girder cranes) in any single span. Provide a bridge girder of specially designed trackage in accordance with MH 27.1 Duty Class C, e.g., patented track beam constructed from welded steel components. Minimize splices in the bridge girder and avoid splices in locations of high stress. Provide full penetration welds at splices.

D102002 1.3.2 Runway Rails

Provide runway rails in accordance with MH 27.1 of length and span to meet the requirements of the facility final design. Attachment to overhead structures or building columns must be as shown in the Project Program without exceeding design loads.

D102002 1.3.3 Hoist and Trolley

Provide electric, air-powered, or manual hoist and trolley in compliance with the general requirements of the paragraphs entitled BASIC REQUIREMENTS FOR CRANES OR MONORAILS WITH HOISTS/TROLLEYS above and the specific requirements **HOISTS** below.

D102002 1.3.4 Drop Lugs

Provide safety lugs or drop lugs or a functionally equivalent feature on the trolley frame and end truck frames to prevent a load drop of more than one inch or derailing in the event of wheel or axle failure.

D102002 1.3.5 Stops

Provide extended wrap-around trolley frame plates or similar to contact the trolley end stops. The trolley wheels must not contact the end stops. End stops on the bridge and trolley runway may be the standard product of the runway and bridge girder manufacturer.

D102003 MONORAILS

Provide a monorail system with hoist and trolley complete, tested and ready for operation. The hoist and trolley must be electric, pneumatic, manual or push operation as indicated in the Project Program. Crane, hoist, trolley, equipment, materials, installation, examination, inspection, and workmanship must be in accordance with the applicable requirements of ASME B30.11 and MH 27.1, Duty Class C, as modified and supplemented by this RFP. Monorail must be patented track. In addition to the general requirements of the paragraphs entitled BASIC REQUIREMENTS FOR CRANES OR MONORAILS WITH HOISTS/TROLLEYS above, the following design requirements apply:

D102003 1.1 HOIST AND TROLLEY

Provide electric, air-powered, or manual hoist and trolley in compliance with general requirements of the paragraphs entitled BASIC REQUIREMENTS FOR CRANES OR MONORAILS WITH HOISTS/TROLLEYS above and the

specific requirements of HOIST below.

D102003 1.2 MONORAIL BEAM

Provide the monorail beam of specially designed trackage in accordance with MH 27.1 Duty Class C, e.g., patented track beam. Provide standard catalog devices for connection of the track to the indicated supporting structures. If track manufacturer's catalog devices are not provided for this suspension system, complete shop drawings and calculations for each custom suspension device must be submitted for review.

D102003 1.3 DROP LUGS

Provide safety lugs (drop stops) or a functionally equivalent feature on the trolley frame to limit trolley drop to 1 inch in the event of wheel or axle failure.

D102003 1.4 TROLLEY STOPS

Provide trolley stops to stop trolley motion at both ends of the monorail. Extended wrap-around trolley frame plates or similar to contact the end stops. The trolley wheels must not contact the end stops.

D102003 1.5 END STOPS

End stops may be the standard design of the monorail manufacturer.

D102004 HOIST

Comply with the packaged hoist units design requirements of ASME HST-1 (electric chain), HST-2 (hand chain), HST-4 electric wire rope), HST-5 (pneumatic chain) or HST-6 (pneumatic wire rope), with modifications as specified herein. Comply with the safety requirements of ASME B30.16 on all hoists.

D102004 1.1 CAPACITY

Provide the hoist minimum rated load capacity as required by the Project Program. Mark the hoist capacity in pounds on both sides of the hoist or load block. Size lettering to be easily read from the floor.

D102004 1.2 ELECTRIC POWERED WIRE ROPE HOIST(S)

Provide electric wire rope hoists to comply with "should" and "shall"/"must" statements of AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) B30.16 and ASME HST-4, Class H3 or higher, except as modified and supplemented herein. Provide double-reeved wire rope type hoist reeving systems.

D102004 1.2.1 Hoist Brakes

Equip each hoist with one electro-mechanical brake plus a mechanical load brake, each with a minimum torque rating of 125% of the rated motor torque. Provide adjustable brake torque

settings on the electro-mechanical brakes. The electromechanical brake and mechanical load brake each must be able to independently stop and hold the maximum test load. Electro-mechanical hoist brakes must be provided with a manual, self-return to ON, release mechanism. Maintained OFF, release mechanisms are not permitted. Design all electro-mechanical hoist brakes to permit easy access for inspection and adjustment.

D102004 1.2.2 Hoist Limits

Provide electric powered wire rope hoist(s) limits as follows:

a. Provide two upper limit switches. Provide geared control circuit type primary switches (rope guide actuated limit switches are not acceptable). When the primary upper limit is reached, the operator must still be able to lower the block out of the upper limit switch. Lowering of the block must automatically reset the primary limit switch. The hoist secondary upper limit switch must be a mechanical block actuated control circuit type limit switch. The block actuated switch must remove all power from the affected hoist drive motor and brake independent of the hoist drive controller, utilizing a hoist line contactor, and set the brake when the secondary upper limit is reached. Provide a spring-returned three position keyed bypass switch on the hoist control panel to bypass the hoist limits. The far right position must allow resetting of the secondary upper limit switch prior to resuming operation. During resetting of the secondary limit, the hoist must operate in the lowering direction only. The far left position must allow bypassing of the primary upper limit switch to allow the secondary limit switch to be tested on a periodic basis. The center position of the bypass switch must be the NORMAL position with neither upper limit being bypassed.
b. Provide a geared control circuit type hoist lower limit switch. When the lower limit is reached, the operator must still be able to raise the block. Automatically reset the limit switch when the block is raised.

D102004 1.3 ELECTRIC POWERED CHAIN HOIST(S)

Provide electric powered chain hoists to comply with "should" and "shall"/"must" statements of AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) B30.16 and ASME HST-1, Class H3 or higher, except as modified herein and supplemented herein.

D102004 1.3.1 Hoist Brakes

Equip the hoist with one electro-mechanical brake plus a mechanical load brake, each with a minimum torque rating of 131.25% of the rated motor torque. Provide adjustable brake torque setting on electro-mechanical brakes. The electromechanical brake and mechanical load brake each must be able to independently stop and hold the maximum test load. Provide electro-mechanical hoist brakes with a manual, self-return to ON, release mechanism. Maintained OFF, release

mechanisms are not permitted. Design all electro-mechanical hoist brakes to permit easy access for inspection and adjustment.

D102004 1.3.2 Chain Container

Equip chain hoists of 10 foot (3 meters) lift or more with a fabric or corrosion resistant metal load chain container.

D102004 1.3.3 Overtravel Limits

Provide a mechanical block actuated control circuit type upper limit switch or a chain stop with a geared upper limit switch to prevent two blocking of the hoist.

D102004 1.3.3.1 Block Actuated Switch

Provide a block actuated switch that does the following:

a. Remove all power from the affected hoist drive motor and brake independent of the hoist drive controller, utilizing a hoist line contactor, and set the hoist brake.
b. Include a spring-returned reset switch on the operator's controller to allow resetting the switch to resume hoist operation. When the spring-returned switch is activated but prior to exiting the limit switch, the hoist must operate only in the lowering direction.

D102004 1.3.3.2 Geared Upper Limit Switch

Provide a geared upper limit switch that does the following:

a. Provide a control circuit type and when reached, allow the operator to lower the block out of the limit. Automatically reset the limit switch when the block is lowered.
b. b. Include a spring-returned keyed bypass switch on the hoist control panel to bypass the limit for functional testing of the chain stop.

D102004 1.3.3.3 Geared Lower Limit Switch

Provide a geared control circuit type hoist lower limit switch or chain stop. When the lower limit is reached, the operator must still be able to raise the block. Automatically reset the limit switch when the block is raised. If a geared lower limit switch is provided, then a chain stop is still required to prevent the load chain from running out of the hoist at its fully extended position.

D102004 1.4 PNEUMATIC POWERED WIRE ROPE HOIST(S)

Provide pneumatic powered wire rope hoists that comply with all "should" and "shall"/"must" statements of AMERICAN NATIONAL STANDARDS

INSTITUTE (ANSI) B30.16 and ASME HST-6 Duty Class A4. Provide double-reeved wire rope hoist type reeving system.

D102004 1.4.1 Hoist Brakes

Equip the hoist with a braking system that can stop and hold 125% of the rated hoist capacity. The hoist braking system must be able to prevent uncontrolled lowering of the load in the event of a loss of air supply. Provide hoist brakes with a manual, self-return to ON, release mechanism. Maintained OFF, release mechanisms are not permitted. Design hoist brakes to permit easy access for inspection and adjustment.

D102004 1.5 PNEUMATIC POWERED CHAIN HOIST(S)

Provide hoist or hoist/trolley unit that complies with all "should" and "shall" statements of AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) B30.16 and the American Society of Mechanical Engineers (ASME) HST-5, Duty Cycle A4.

D102004 1.5.1 Hoist Brake

Design the hoist braking system to prevent an uncontrolled lowering of the load in the event of a loss of air supply, and can stop and hold 131.25% of rated capacity. Provide hoist brakes with a manual, self-return to ON, and release mechanism. Maintained OFF, release mechanisms are not permitted. Design hoist brakes to permit easy access for inspection and adjustment.

D102004 1.5.2 Chain Container

Equip chain hoists of 10 foot (3 meters) lift or more with a fabric or corrosion resistant metal load chain container

D102004 1.6 MANUAL HOIST WITH TROLLEY

Provide hoist or hoist/trolley unit that complies with all "should" and "shall"/"must" statements of AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) B30.16 and ASME HST-2.

D102004 1.6.1 Hoist Brake

Provide a hoist mechanical load brake that can stop and hold 125% of rated capacity.

D102004 1.6.2 Chain Container

Equip chain hoists of 10 foot (3 meters) lift or more with a fabric or corrosion resistant metal load chain container

D102004 1.6.3 Hoist Overload Limiting Device

Equip the hoist with a means to prevent destructive overloads.

D1030 ESCALATORS AND MOVING WALKS

Comply with ASME A17.1 and ASME A17.2.

D103001 ESCALATORS

Comply with ASME A17.1 and ASME A17.2.

D103002 MOVING WALKS

Comply with ASME A17.1 and ASME A17.2.

D109002 CONVEYORS

Comply with ASME B20.1, *Safety Standards for Conveyors and Related Equipment*.

SECTION D20

PLUMBING
12/18

D20 GENERAL

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

D20 1.1 NARRATIVE

Use this section in conjunction with all parts of the Design Build (D/B) Request for Proposal (RFP) to determine the full requirements of this solicitation.

This section includes the construction of interior plumbing systems. This section covers installations inside the facility and out to the five foot line. See Section G30, *Site Civil/Mechanical Utilities*, for continuation of systems beyond the five foot line.

D20 1.2 PLUMBING DESIGN GUIDANCE

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

D20 1.2.1 Government Standards

Federal Energy Management Program (FEMP)

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s): UFC 3-401-01, Mechanical Engineering UFC 3-420-01, Plumbing Systems)
UFC 1-200-02	High Performance and Sustainable Building Requirements

D20 1.3 DESIGN SUBMITTALS

Submit design submittals in accordance with Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, and UFC 3-401-01, *Mechanical Engineering*.

D20 1.4 CONSTRUCTION SUBMITTALS

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

Fixtures, equipment, and OMSI information for all equipment and fixtures.

D20 1.5 QUALITY CONTROL

Upon completion of the installation test all systems in accordance with the IPC.

D2010 PLUMBING FIXTURES

Provide EPA's "WaterSense" labeled fixtures where available.

D201001 WATER CLOSETS

D201001 1.1 FLUSH VALVE WATER CLOSETS

ASME A112.19.2, white vitreous china, siphon jet. Provide ASME A112.19.5 trim. Provide self-closing metering type flush valve, unless automatic flush control is specified in the ESR Section D20. Automatic flush control must conform to UL 1951 and ASSE 1037. Automatic flushing systems to consist of solenoid-activated valves with light beam sensors and include an override pushbutton. Flush valve not to exceed 1.28 GPF (4.8 LPF). Mount handicapped fixtures at a height and provide appurtenances in accordance with ABA Standards.

D201001 1.2 DUAL FUNCTION FLUSH VALVE WATER CLOSETS

ASME A112.19.2, white vitreous china, siphon jet. Provide ASME A112.19.5 trim. Provide self-closing metering type dual function flush valve, unless automatic flush control is specified in the ESR Section D20. Automatic flush control must conform with UL 1951 and ASSE 1037. Automatic flushing systems to consist of solenoid-activated valves with light beam sensors and include an override pushbutton. Dual function flush valve must provide a flush of 0.8 to 1.1 GPF (3.0 to 4.2 LPF) or 1.28 GPF (4.8 LPF). Maximum flush volume not to exceed 1.28 GPF (4.8 LPF). Mount handicapped fixtures at a height and provide appurtenances in accordance with ABA Standards.

D201001 1.3 FLUSH TANK WATER CLOSETS

ASME A112.19.2, white vitreous china, siphon jet. EPA "WaterSense" labeled. Provide ASME A112.19.5 trim. Water flushing volume of the water closet not to exceed 1.28 GPF (4.8 LPF). Mount handicapped fixtures at a height and provide appurtenances in accordance with ABA Standards.

D201001 1.4 DUAL FUNCTION FLUSH TANK WATER CLOSETS

ASME A112.19.2, white vitreous china, siphon jet. Provide ASME A112.19.5 trim. Dual function flush tank water closet providing a dual flush of 0.8 to 1.1 GPF (3.0 to 1.6 LPF) or 1.28 GPF (4.8 LPF). Maximum flush tank volume not to exceed 1.28 GPF (4.8 LPF). Mount handicapped fixtures at a height and provide appurtenances in accordance with ABA Standards.

D201002 URINALS

D201002 1.1 FLUSH VALVE URINALS

ASME A112.19.2, white vitreous china, wall-mounted, wall outlet, siphon jet, integral trap, extended side shields. EPA "WaterSense" labeled. Provide large diaphragm (not less than 2.625 inches (66 mm) upper chamber inside diameter at the point where the diaphragm is sealed between the upper and lower chambers) flush valve of chrome plated cast brass conforming to ASTM B 584, including vacuum breaker and angle (control-stop) valve. Maximum flush valve volume not to exceed 0.5 gallons per flush (1.9 lpf). Provide ASME A112.19.5 trim and ASME 112.6.1M concealed chair carriers. Provide self-closing metering type flush valve, unless automatic flush control is specified in the ESR Section D20. Automatic flush control in conformance with UL 1951 and ASSE 1037. Automatic flushing systems to consist of solenoid-activated valves with light beam sensors and include an override pushbutton. Select and install urinals and appurtenances in accordance with the ABA Standards.

D201002 1.2 WATERLESS URINALS

ASME A112.19.2, white vitreous china, wall-mounted, wall outlet, non-water using, integral drain line connection, with sealed replaceable cartridge or integral liquid seal trap insert. The urinal and trap assembly must maintain a sufficient barrier of a biodegradable immiscible liquid to provide the trap seal and inhibit the backflow of sewer gases. For urinals that use a replaceable cartridge, provide four additional cartridges for each urinal installed. Provide an additional quart of biodegradable liquid for each urinal installed. Provide ASME A112.6.1M concealed chair carriers. Install and test in accordance with the manufacturers’ recommendations. Drain lines that connect to the urinal outlet must not be made of copper tube or pipe. Select and install urinal and appurtenances in accordance with ABA Standards. Slope the sanitary sewer branch line for waterless urinals a minimum of 1/4-inch per foot. Provide manufacturer's operating manual and on-site training for the proper care and maintenance of the urinal.

D201003 LAVATORIES

D201003 1.1 COUNTERTOP LAVATORIES

Unless integral bowl is specified elsewhere, lavatories to be white, ASME A112.19.2 vitreous china lavatories with minimum dimensions of 19 inches (483 mm) wide x 18 inches (457 mm) front to rear, and self-rimming type. Provide ASME 112.18.1 copper alloy centerset faucets unless self-closing metering or automatic control is specified in ESR section D20. Automatic faucet systems to consist of solenoid-activated valves with light beam sensors and include an override pushbutton. Provide EPA "WaterSense" labeled faucets. Provide with aerator, adjustable P-traps, and perforated grid strainers, unless pop-up drain fittings are specified in ESR section D20.

D201003 1.2 WALL-MOUNTED LAVATORIES

ASME A112.19.1, white enameled cast-iron or ASME A112.19.2 white vitreous china with ASME A112.6.1M concealed arm carrier support, with minimum dimensions of 19 inches wide by 18 inches (483 mm wide by 457 mm) front to rear. Provide ASME 112.18.1 copper alloy centerset faucets unless self-closing metering or automatic control is specified in ESR section D20. Automatic faucet systems to consist of solenoid-activated valves with light beam sensors and include an override pushbutton. Provide EPA "WaterSense" labeled faucets. Provide with aerator, adjustable P-traps, and perforated grid strainers, unless pop-up drain fittings are specified in ESR section D20.

D201003 1.3 HANDICAPPED LAVATORIES

Same as Paragraphs 1.1 or 1.2, except height and appurtenances to be in accordance with ABA Standards.

D201004 SINKS

D201004 1.1 COUNTERTOP SINKS

ASME A112.19.3 sink, 20 gage stainless steel with integral mounting rim, minimum dimensions of 33 inches (840 mm) wide for two compartment or 21 inches (560 mm) wide for one compartment by 21 inches (560 mm) front to rear, with ledge back and undersides coated with sound dampening material. Provide top-mounted ASME A112.18.1 copper alloy faucets, swing spout with aerator, and stainless steel drain outlets with cup strainers. Provide adjustable P-trap with drain piping to vertical vent stack. If specified in ESR section D20, provide UL 430 waste disposer unit in right compartment.

D201004 1.2 SERVICE SINKS

ASME A112.19.1, white enameled cast-iron or ASME A112.19.2 white vitreous china, wall mounted and floor supported by wall outlet cast-iron P-trap, minimum dimensions of 22 inches (560 mm) wide by 20 inches (508 mm) front to rear with 10 inch (254 mm) splashback, and stainless steel rim guard. Provide ASME A112.18.1 copper alloy back-mounted combination faucets with vacuum breaker and 0.75 inch (20 mm) external hose threads.

D201004 1.3 MOP SINKS

Pre-cast terrazzo floor-mounted mop sink, 36 inches x 36 inches x 12 inches (914 mm x 914 mm x 305 mm), made of marble chips cast in white Portland cement to a compressive strength of not less than 3000 PSI (20.7 mPa) 7 days after casting. Provide brass body drains with nickel bronze strainers cast integral with terrazzo. Provide stainless steel rim guard for mop sink. Provide chrome-plated exposed hot and cold water faucets ASME A112.18.1 wall-mounted copper alloy faucets swing spout with 3/4 inch (20 mm) hose connection, vacuum breaker, and pail hook. Provide mop hanger on wall above sink suitable for four mops.

D201004 1.4 LAUNDRY SINKS

IAPMO Z124.6, plastic, two compartment, minimum dimensions of 40 inches wide by 21 inches (1016 mm wide by 533 mm) front to rear, with floor-supported steel mounting frame secured to wall. Provide ASME A112.18.1 copper alloy centerset faucets, swing spout with aerator, and stainless steel drain outlets with cup strainers, and 1.5 inch (40 mm) adjustable P-trap with drain piping to vertical vent stack.

D201005 SHOWERS/TUBS

D201005 1.1 ONE PIECE BATH AND SHOWER MODULES

IAPMO Z124, made of white fiberglass reinforced plastic (FRP) or acrylic with slip-resistant bathing surfaces, integral grab bar, and three walls integrally molded in one piece. Provide outlet at left or right as necessary to suit module arrangement. Provide pop-up drain fittings and adjustable P-trap. Provide diverter type bathtub and shower supply fittings with body mounted from behind the wall. Provide tub fill over-rim spout with diverter.

D201005 1.2 SHOWER STALLS

IAPMO Z124, made of white solid acrylic pressure molded fiberglass reinforced plastic (FRP) shower stalls. Stalls to be scratch-resistant, waterproof and reinforced with integral grab bar, and three walls integrally molded in one piece. Provide diverter type shower supply fittings with body mounted from behind the wall.

D201005 1.3 SHOWER FLOORS

Precast terrazzo or Acrylic Shower Floors: Terrazzo must be made of marble chips cast in white Portland cement to produce a compressive strength of not less than 3000 psi (20.7 MPa) 7 days after casting. Provide brass body drains with nickel bronze strainers cast integral with terrazzo.

D201005 1.4 BATHTUBS

ASME A112.19.1 white enameled cast-iron or porcelain steel bathtubs, recessed type, minimum dimensions of 60 inches (1524 mm) wide by 30 inches (762 mm) front to rear by 16 inches (406 mm) high with drain outlet for above-the-floor drain installation. Provide diverter type bathtub and shower supply fittings with body mounted from behind the wall. Provide tub overfill rim spout with diverter.

D201005 1.5 SHOWER SUPPLY FITTINGS

ASME A112.18.1, ball joint, self-cleaning, adjustable spray pattern shower heads, connected to concealed pipe connected to copper alloy pressure balance single control type mixing valves with front access integral screwdriver stops. Provide EPA "WaterSense" labeled showerhead. Anchor the mixing valves and the pipe to each showerhead in wall to prevent movement.

D201005 1.6 HANDHELD SHOWER HEAD

ASSE 1014, adjustable spray hand-held shower head with swivel fitting, 60 inch (1524 mm) minimum flexible chrome plated copper alloy hose and in-line vacuum breaker. Provide push button flow control if specified in ESR section D20. Provide 25 inch (635 mm) grab bar with sliding spray holder that locks at any height.

D201006 DRINKING FOUNTAINS AND COOLERS

D201006 1.1 DRINKING FOUNTAINS

Wall mounted drinking fountain, constructed of white enameled cast iron with bubbler and push button control. Mount handicapped fixture at a height and provide appurtenances in accordance with ABA Standards.

D201006 1.2 ELECTRIC WATER COOLERS

AHRI 1010, wall-mounted, bubbler style, air-cooled condensing unit, 8.0 gph (.5 L per second) minimum capacity, stainless steel splash receptor, double wall heat exchanger, and all stainless steel cabinet. Provide ASME A112.6.1M concealed wall hangers with thru-bolts and back plates. Mount handicapped fixture and provide appurtenances in accordance with ABA Standards.

D201090 EMERGENCY FIXTURES

Pressure-compensated tempering valve is required for emergency fixtures, with leaving water temperature setpoint adjustable throughout the range 60 to 95 degrees F (15.5 and 35 degrees C) unless cold water supply meets temperature criteria.

Provide packaged, UL listed, alarm system; including an amber strobe lamp, horn with externally adjustable loudness and horn silencing switch, mounting hardware, and waterflow switch, assembled and prewired for waterproof service within NEMA Type 3 or 4 enclosures or for explosion proof service within NEMA Type 7 or 9 enclosures.

D201090 1.1 EMERGENCY SHOWER

ISEA Z358.1, wall-mounted self-cleaning, non-clogging 10 inch (250 mm) diameter stainless steel deluge shower head with elbow, one inch (25 mm) full-flow stay-open ball valve with pull rod and 8 inch (200 mm) diameter ring or triangular handle, one inch (25 mm) interconnecting fittings.

D201090 1.2 EMERGENCY EYE & FACE WASH

ISEA Z358.1, wall-mounted self-cleaning, non-clogging eye and face wash with quick opening, full-flow valves, stainless steel eye and face wash receptor. Provide copper alloy control valves.

D201090 1.3 COMBINATION EMERGENCY SHOWER & EYEWASH

ISEA Z358.1, column mounted on a floor flange. Design combination unit so components can be operated individually from a common fixture supply line. Provide a self-cleaning, non-clogging 10 inch (250 mm) diameter stainless steel deluge shower head with elbow, full flow stay-open ball valve with pull rod and 8 inch (200 mm) diameter ring or triangular handle one inch (25 mm) interconnecting fittings. Provide a self-cleaning, non-clogging eye and face wash with quick opening, full-flow valves, stainless steel eye and face wash receptor. Provide copper alloy control valves.

D2020 DOMESTIC WATER DISTRIBUTION

D202001 PIPES & FITTINGS

D202001 1.1 COPPER

Use copper tubing and fittings for pipe sizes 4 inches (100 mm) or smaller. Use type L tubing above ground with solder fittings. For buried piping, use type K tubing with solder fittings.

D202001 1.2 CHLORINATED POLYVINYL CHLORIDE (CPVC)

When specified in ESR section D20, provide CPVC pipe, fittings, and solvent cement meeting requirements of ASTM D 2846/D 2846M for sizes 4 inches (100 mm) and smaller. Provide transition union connections or threaded gate valve between metallic piping and CPVC piping.

D202002 VALVES & HYDRANTS

D202002 1.1 VALVES

Provide valves at water supplies to fixtures and to provide ease of maintenance.

D202002 1.2 HOSE BIBBS & HYDRANTS

Use non-freeze wall hydrants where the winter design temperature is at or below freezing. Hose bibbs are acceptable for use elsewhere.

D202002 1.2.1 Hose bibbs

Angle type, copper alloy hose bibbs with vacuum breaker.

D202002 1.2.2 Wall Hydrants

Non-freeze, ASSE 1019, cast bronze, with vacuum breaker, locking shield and tee-handle.

D202003 DOMESTIC WATER EQUIPMENT

D202003 1.1 BACKFLOW PREVENTERS

Provide backflow prevention devices that are approved by the State or local regulatory agencies. If there are no State or local regulatory agency requirements, provide backflow prevention devices that are listed by the Foundation for Cross-Connection Control & Hydraulic Research (FCCHR), or any other approved testing laboratory having equivalent capabilities for both laboratory and field evaluation of backflow prevention devices and assemblies. Provide freeze protection for aboveground exterior applications in areas where the winter design temperature is at or below freezing.

D202003 1.2 WATER HEATERS

Provide heaters complete with control system, gauges and ASME rated combination pressure and temperature relief valve. Heaters must meet the performance requirements of ASHRAE 90.1-2013 Table 7.8. Automatic storage type heaters must meet the Energy Star product definition specified in https://www.energystar.gov/products/spec and product to be Energy Star certified. For storage type water heaters, provide ASME code stamped tanks for domestic hot water. Lining must meet NSF 61.

D202003 1.2.1 Electric Water Heaters

Electric water heaters with double heating element meeting requirements of UL 174 for water heaters with less than 120 gallons of storage and 200,000 btuh input. Provide water heater meeting requirements of UL 1453 for commercial water heaters with 120 gallons of storage or more and 200,000 btuh input or more. Provide water heaters equipped with glass-lined steel tanks, high efficiency type, insulated with polyurethane foam insulation, replaceable anodes, and adjustable range thermostat to allow hot water settings between 90 and 160 degrees F (32 and 71 degrees C). Water heater warranty must be a minimum of 5 years. In accordance with FEMP requirements, heaters with storage capacity of 55 gallons (209 liters) or less and maximum energy input of 12 kW must have a minimum energy factor (EF) of 0.93 or higher and an annual energy usage of 4,721 kWh or less tested in accordance with U.S. Department of Energy (DOE) test procedure (10 CFR 430, Subpart B, Appendix E). Heaters with storage capacity of greater than 55 gallons (209 liters) and maximum energy input of 12 kW must have a minimum energy factor (EF) of 0.92 and an annual energy usage of 4,773 kWh or less tested in accordance with U.S. Department of Energy (DOE) test procedure (10 CFR 430, Subpart B, Appendix E).

D202003 1.2.2 Gas-Fired Water Heaters

High efficiency storage type water heaters meeting requirements of CSA/AM Z21.10.1 for water heaters with less than 120 gallons of storage and input ratings of 75,000 btuh or less. Provide water heater meeting requirements of CSA/AM Z21.10.3 for commercial water heaters with 120 gallons of storage or more and input ratings above 75,000 btuh. Water heaters must meet AGA requirements. Provide water heaters equipped with glass-lined

steel tanks, polyurethane foam insulation, replaceable anodes, and adjustable range thermostat to allow hot water settings between 110 and 160 degrees F (43 and 71 degrees C). Water heater warranty must be a minimum of 5 years. Provide vent in accordance with NFPA 54.

D202003 1.2.3 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. Design oil-fired water heater system in accordance with NFPA 31.

D202003 1.2.4 Electric Instantaneous Water Heaters (Tankless)

UL 499, heater(s) of the modulating, under the sink, point-of-use type. Output temperature must be adjustable from 40 degrees F to 160 degrees F. Heating elements must be field replaceable. Unit(s) must have a minimum 5-year warranty.

D202003 1.2.5 Steam Heat Exchangers

Double wall copper tube domestic water heating elements constructed with air gap to atmosphere between the two walls using steam as the heating medium exterior of the heating elements. Provide posted operating instructions for water heaters.

D202003 1.2.6 Storage Tanks

AWWA D100, glass- or cement-lined vertical steel tanks, minimum of 125 psig (862 kPa) (gage) working pressure.

D202003 1.3 PUMPS

D202003 1.3.1 Inline Pumps

In-line circulator for service water distribution system. Factory assembled and tested pumps constructed of materials suitable for hot domestic water service.

D202003 1.3.2 Base Mounted Pumps

Potable water service, base mounted, end suction pumps with mechanical seals and drip-proof electric motors.

D202003 1.4 DOMESTIC WATER PRESSURE BOOSTER SYSTEM

Factory assembled, tested, and certified by a single manufacturer who assumes undivided responsibility for the system to include providing start-up services, two days instruction and furnishing related operations and maintenance manuals. Provide each building with its own system. Each system will consist of a minimum of two pumps mounted on a single, welded structural steel base. Provide bladder type low-flow

accumulator storage tank, lead-lag pump alternator selector switches and all related controls and alarms required for safe and proper system operation. Provide constant speed or variable frequency drive pump operation.

D202003 1.5 EXPANSION TANKS

Steel expansion tank with potable water rated polypropylene or butyl lined diaphragm at water heater.

D202003 1.6 WATER METERS

See PTS G30, Site Civil/Mechanical Utilities, for water meter requirements.

D202003 1.7 MASTER THERMOSTATIC MIXING VALVES

ASSE 1017.

D202004 INSULATION & IDENTIFICATION

D202004 1.1 PIPING INSULATION

Mineral fiber insulation on domestic hot water supply and recirculation piping. Insulate domestic cold water piping with cellular glass insulation.

D202004 1.2 PIPING & EQUIPMENT IDENTIFICATION

In addition to the requirements in Section Z10, *General Performance Technical Specification*, provide engraved brass, laminated plastic, or engraved anodized aluminum nameplates for valves. Stop valves in supplies to fixtures will not require nameplates. Identify above ground pipe with the type of service and direction of flow. Letter size, lengths and colors to be in accordance with ANSI A13.1.

D202005 SPECIALTIES

D202005 1.1 WASHING MACHINE CONNECTOR BOX

Recessed wall box fabricated of PVC plastic. Provide bronze dual washing machine valve with single lever shut-off.

D202005 1.2 VALVE BOXES

For each buried valve provide cast-iron, ductile-iron box of a suitable size. Provide cast-iron or ductile-iron cover for the box with the word "WATER" cast on the cover.

D202005 1.3 WATER HAMMER ARRESTORS

PDI WH 201, water hammer arrestors in lieu of air chambers.

D202005 1.4 ICEMAKER CONNECTOR BOX

Recessed wall box fabricated of PVC plastic. Provide bronze shut-off

valve.

D202090 OTHER DOMESTIC WATER SUPPLY

D202090 1.1 SUPPORTS

Provide piping supports. If a supported floor slab is used, support all piping located below the building from the building support slab.

D202090 1.2 INSPECTIONS

Prior to initial operation, inspect piping system for compliance with drawings, specifications, and manufacturer's submittals.

D202090 1.3 DISINFECTION

Upon completion of the installation, disinfect all systems.

D2030 SANITARY WASTE

D203001 WASTE PIPE & FITTINGS

D203001 1.1 PIPING AND FITTINGS

Cast iron hub and spigot pipe and fittings, rubber compression gasket joints or cast-iron hubless pipe and fittings, CISPI 301 with CISPI 310 couplings. Where indicated in ESR Section D20, plastic PVC or ABS piping, fittings, and solvent cement meeting requirements of ASTM D 2665 or ASTM D 2661 may be provided. Equip plastic piping with approved firestopping devices as required by code.

D203001 1.2 CLEANOUTS

Provide cleanouts. Utilize material consistent with the piping system materials. Do not locate sanitary cleanouts within occupied spaces, with the exception of toilet and janitor spaces.

D203002 VENT PIPE & FITTINGS

Cast-iron hubless pipe and fittings, CISPI 301 with CISPI 310 couplings. Where indicated in ESR Section D20, plastic PVC or ABS piping, fittings, and solvent cement meeting requirements of ASTM D 2665 or ASTM D 2661. Equip PVC piping with approved firestopping devices as required by code. Single drainage/vent stack systems (such as Philadelphia system) and mechanical air admittance valves are not acceptable.

D203003 FLOOR DRAINS

Flush strainer or extended rim type. Provide in mechanical rooms, restrooms, fire pump room, laundry room, and plumbing chase areas. Also provide floor drains in specific areas of subsistence buildings and cold-storage buildings as identified in UFC 3-420-01. Provide floor sinks in kitchens. Provide floor sinks where required for interior air handling unit condensate drains. Install condensate and drain piping to avoid interference with equipment access and prevent trip hazards.

D203004 SANITARY & VENT EQUIPMENT

D203004 1.1 PUMPS

D203004 1.1.1 Sump Pumps

Factory assembled and tested submersible type pumps for operation under water.

D203004 1.1.2 Sewage Pumps

FS A-A-50555, single or duplex type to meet demand. For duplex types, provide with automatic controls to alternate the operation from one pump to the other.

D2040 RAIN WATER DRAINAGE

D204001 PIPE & FITTINGS

Cast iron hubless pipe and fittings, CISPI 301 with CISPI 310 couplings. Where indicated in ESR Section D20, plastic PVC or ABS piping, fittings, and solvent cement meeting requirements of ASTM D 2665 or ASTM D 2661 may be used. Equip PVC piping with approved firestopping devices as required by code.

D204002 ROOF DRAINS

ASME A112.6.4, with dome and integral flange. Provide a device for making a watertight connection between roofing and flashing.

D204003 RAIN WATER DRAINAGE EQUIPMENT

Where required by building design, provide expansion joint(s) of proper size to receive the conductor pipe. The expansion joint must consist of a heavy cast-iron housing, brass or bronze sleeve.

D204004 INSULATION & IDENTIFICATION

Provide flexible elastomeric cellular, faced phenolic foam, or cellular glass insulation on all drainage piping that may be subject to condensation. Provide a vapor retarder. Identify aboveground pipe with the type of service and direction of flow. Letter size, lengths and colors to be in accordance with ANSI A13.1.

D2090 OTHER PLUMBING SYSTEMS

D209001 SPECIAL PIPING SYSTEMS

D209001 1.1 NATURAL GAS PIPING

Conform to requirements of the local natural gas utility and ASME B31.8, *Gas Transmission and Distribution Piping Systems*, for exterior piping. Conform to requirements of NFPA 54, *National Fuel Gas Code*, for interior gas piping. Provide meter and pressure regulator in accordance with the requirements of the local utility. Provide earthquake valve where required by code.

D209002 ACID WASTE SYSTEMS

Acid-resistant DWV pipe, fittings, and couplings with mechanical, bell and spigot, or fusion type joints. Material for buried piping and aboveground piping must be silicon-iron composition. Borosilicate glass pipe and fitting may be provided for aboveground piping where acid composition dictates, except vent piping through and above roofs must be silicon-iron composition. Provide cleanouts and drains as specified for DWV piping, except material must be silicon-iron composition.

D209003 INTERCEPTORS

D209003 1.1 OIL INTERCEPTOR

Oil interceptor, where required, with a minimum flow capacity to meet system demand.

D209003 1.2 GREASE INTERCEPTORS

Provide in accordance with PDI G 101.

D209005 COMPRESSED AIR SYSTEM (NON-BREATHING)

D209005 1.1 AIR COMPRESSOR

Factory packaged electric motor driven, duplex air compressor including manufacturer’s standard air filter, oil filter, and plug drain. Air compressor, aftercooler, and receiver must be factory packaged as a unit. Receiver tank must meet requirements of ASME PBVC Sec. VIII D1, labeled and rated for 200 PSI (1.38 MPa) gage, equipped with required valves and trimmings, including gage and automatic drain valve and ASME BPVC pressure safety relief valve. Size air compressor and receiver in accordance with the Compressed Air and Gas Institute (CAGI) guidelines. Locate air compressor away from noise sensitive areas.

D209005 1.2 REFRIGERATED AIR DRYER

Low-pressure compressed air dryer of the mechanical refrigeration type, equipped with an automatic temperature shutdown switch to prevent freezing, a regenerative air-to-air exchanger (as standard with the manufacturer), and a main compressed air cooling exchanger. Refrigeration system must use non-CFC refrigerant and must cool compressed air to dry the air. Dryer operating pressure not less than 125 PSI (862 kPa) gage. Size the dryer based on system pressure, the entire system air flow, and providing air with a dew point 5 degrees F (-15 degrees C) lower than the most stringent equipment or outlet requirement. The pressure drop of the dryer must not exceed 2 PSI (13.8 kPa) gage.

D209005 1.3 COMPRESSED AIR PIPING SYSTEM

Piping in conformance with the requirements of ASME B31.1 for materials, assembly, and testing. Provide steel, black seamless schedule 40 carbon steel piping material meeting requirements ASTM A 53/A 53M with threaded fittings or copper tubing meeting requirements of ASTM B 88, Type K or Type L, hard drawn, Class 1, with wrought

copper or bronze fittings. Provide compressed air drops in locations to facilitate work required with quick disconnects throughout the work areas to allow connection of such as pneumatic tools and air guns. Equip each air drop with a filter/moisture separator, pressure gauge, air pressure regulator, and a quick-disconnect.

-- End of Section --

SECTION D30

HVAC
06/23

D30 GENERAL

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

D30 1.1 NARRATIVE

This section includes the construction of interior mechanical systems. This section covers installations inside the facility and out to the five foot line. See Section G30, *Site Civil/Mechanical Utilities*, for continuation of systems beyond the five-foot line.

D30 1.2 MECHANICAL DESIGN GUIDANCE

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

D30 1.2.1 Government Standards

Federal Energy Management Program (FEMP)

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s): UFC 3-401-01, Mechanical Engineering UFC 3-420-01, Plumbing Systems)
UFC 1-200-02	High Performance and Sustainable Building Requirements
UFC 3-440-01	Facility-Scale Renewable Energy Systems

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS 01 78 24.00 20	Facility Data Workbook (FDW)
UFGS 23 05 93	Testing, Adjusting, and Balancing for HVAC
UFGS 23 09 00	Instrumentation and Control for HVAC
UFGS 23 09 23.02	BACnet Direct Digital Control for HVAC and Other Building Control Systems
UFGS 23 09 13	Instrumentation and Control Devices for HVAC
UFGS 23 81 23	Computer Room Air Conditioning Units

D30 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

a. Verification of satisfactory HVAC system performance must be via Performance Verification Testing, as detailed in this section.
b. The Government reserves the right to witness all Acceptance Tests and Inspections, review data, and request other such additional inspections and repeat tests as necessary to ensure that the system and provided services conform to the stated requirements.
c. The Qualified Testing Organization must provide the Acceptance Tests and Inspections test plan and perform the acceptance tests and inspections. Perform and evaluate test methods, procedures, and test values in accordance with appropriate standards, and the manufacturer's recommendations. Place equipment in service only after completion of required tests and evaluation of the test results have been completed. Supply to the testing organization complete sets of shop drawings, settings of adjustable devices, and other information necessary for an accurate test and inspection of the system prior to the performance of any final testing. Perform acceptance tests and inspections on Computer Room Air Conditioning Units, Direct Digital Control System, and HVAC Testing/Adjusting/Balancing.

D30 1.4 HVAC COMMISSIONING

Commission the HVAC systems per the Commissioning Plan as required by Part 2 Section 01 91 00.15, *Building Commissioning*. HVAC system commissioning must coordinate with and incorporate the testing, reporting, training & O&M documentation requirements of UFGS 23 05 93, *Testing, Adjusting, and Balancing for HVAC;* UFGS 23 09 00, *Instrumentation and Control for HVAC*; UFGS 23 09 23.02, *BACnet Direct Digital Control for HVAC and Other Building Control Systems* and UFGS 23 09 13, *Instrumentation and Control Devices for HVAC*.

D30 1.5 DESIGN SUBMITTALS

Submit design Submittals in accordance with Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, and UFC 3-401-01, *Mechanical Engineering*.

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

UFGS 01 78 24.00 20, *Facility Data Workbook (FDW)*

UFGS 23 09 00, *Instrumentation and Control for HVAC*

UFGS 23 09 23.02, *BACnet Direct Digital Control for HVAC and Other Building Control Systems*

UFGS 23 09 13, *Instrumentation and Control Devices for HVAC*

UFGS 23 05 93, *Testing, Adjusting, and Balancing for HVAC*

UFGS 48 14 13.00 20, *Solar Liquid Flat Plate and Evacuated Tube Collectors*

D30 1.6 CONSTRUCTION SUBMITTALS

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

Solar hot water heating system fixtures and equipment, and OMSI information for all equipment and fixtures.

D30 1.7 MOTORS

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

D3010 ENERGY SUPPLY

D301001 OIL SUPPLY SYSTEM

Conform to requirements of International Mechanical Code for piping. Conform to requirements of NFPA 31 for testing. Provide 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 must be positive displacement type. Provide oil filter prior to oil entering appliance or pump. Storage tanks must 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. Provide the complete natural gas system to the facility, including any applications and permits.

D301002 1.2 MATERIALS AND EQUIPMENT

D301002 1.2.1 Aboveground Within Buildings

Black steel meeting requirements of ASTM A 53/A 53M, Schedule 40, and associated ASME fittings threaded ends for sizes 2 inches (50 mm) and smaller; otherwise, plain end beveled for butt welding.

D301002 1.3 PRESSURE TESTS

Pressure test in accordance with NFPA 54 at 1.5 times maximum working pressure, but in no case less than 50 PSI (350 kPa).

D301002 1.4 PROPANE PIPING

If required, provide the same as specified for natural gas and comply with NFPA 58.

D301002 1.4.1 Underground

Polyethylene (PE) pipe conforming to ASTM D 2513 for 100 PSI (690 kPa) (gage) working pressure. Standard Dimension Ratio must be 11.5 maximum. Provide detectable aluminum plastic backed tape or detectable magnetic plastic tape manufactured specifically for warning and identification of direct buried piping. Tape must be detectable by an electronic detection instrument. Warning tape

to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording. Color to be yellow for gas lines. Polyethylene fittings must be ASTM D 2683 socket fittings or ASTM D 2513 molded butt-fusion fittings.

D301002 1.5 PROPANE TANKS

If not provided by the propane provider, the tank material and installation must comply with NFPA 58.

D301003 STEAM SUPPLY SYSTEM (FROM CENTRAL PLANT)

Refer to Section G30, *Site Civil/Mechanical Utilities*

D301004 HOT WATER SUPPLY SYSTEM (FROM CENTRAL PLANT)

Refer to Section G30, *Site Civil/Mechanical Utilities*

D301005 SOLAR ENERGY SUPPLY SYSTEM

Design and build each solar domestic hot water heating system meeting the requirements of UFC 3-440-01 *Facility-Scale Renewable Energy Systems*. Each system must be fully integrated with the building DDC controls system.

Provide complete solar domestic hot water system designed and built by a single contractor who specializes in solar heated water systems. System must be designed, built, and tested by this contractor who is responsible for the provided system to operate as proposed. This design-build contractor must be endorsed in writing, prior to system design, by the manufacturer of the solar plate collectors provided for this solicitation.

The solar domestic hot water system designer must work with the building designers to optimize the roof area, slope and orientation available for solar domestic hot water. Coordinate with other solar systems utilizing the roof area such as photovoltaic systems.

Provide solar liquid flat plate collector systems to comply with the requirements specified in UFGS Section 48 14 13.00 20, *Solar Liquid Flat Plate and Evacuated Tube Collectors.*

D3020 HEAT GENERATING SYSTEMS

D302001 BOILERS

If required, provide Boiler(s) type for the load capacity of the building as indicated in ESR Section D30. Include all equipment efficiencies on the equipment schedules on the drawings.

D302001 1.1 REQUIREMENTS

Design and test boiler in accordance with ASME CSD-1 (Controls and Safety Devices), ASME BPVC SEC IV (Boiler and Pressure Vessel Code), NFPA 54, NFPA 70 and ANSI Z21.13/CSA 4.9. Install boiler in accordance with NBBI NB-23 PART 1. The boiler must meet the requirements of the

UL 795, ANSI Z83.3, and ASME CSD. Design oil-fired boiler system in accordance with NFPA 31. Hot water boilers to meet the following thermal (Et) or combustion (Ec) efficiencies: Natural Gas-fired Hot Water rated at 88 - 732 kW (300,000 to 2,500,000 Btuh) capacity, Et = 80 percent; Natural Gas-fired Hot Water rated greater than 732 kW (2,500,000 Btuh) capacity, Ec = 82 percent; #2 Oil-fired Water rated at 88 - 732 kW (300,000 to 2,500,000 Btuh) capacity, Et = 82 percent; #2 Oil-fired Water rated greater than 732 kW (2,500,000 Btuh) capacity, Ec = 84 percent.

D302001 1.2 BOILER BURNER

Provide burners of the make, model and type certified and approved by the manufacturer of the boiler being provided. Provide burner controls and flame safety equipment conforming to either ASME CSD-1 or NFPA 58 as dictated by the input.

D302001 1.3 BOILER TRIM AND CONTROL EQUIPMENT

D302001 1.3.1 Boiler Controls

Mount controls, including operating switches, indicating lights, gages, alarms, motor starters, fuses, and circuit elements of the control systems, on a single control panel mounted on the burner or separate from the burner. Locate the separate panel at the side of the boiler or in a freestanding control cabinet away from the front of the boiler. When using BACnet communication protocol, use the ASHRAE 135 protocol without gateways to interface with the BACnet Direct Digital Control System in specifications UFGS 23 09 00, UFGS 23 09 23.02 and UFGS 23 09 13.

D302001 1.3.2 Boiler Trim

Comply with ASME BPVC SEC IV, ASME CSD-1, and additional appurtenances as specified herein.

D302001 1.3.3 Pressure Gages

Provide pressure gages with a scale equivalent to 1.5 times the outlet water pressure on supply water piping and return water piping.

D302001 1.3.4 Thermometers

Provide thermometers with a scale equivalent to 1.5 times the outlet water temperature on supply water piping and return water piping.

D302001 1.3.5 Drain Trapping

Provide drain valve and piping to a floor drain.

D302001 1.3.6 Air Vent Valve

Provide with screwed connection, stainless steel disk, and stainless steel seats to vent entrapped air.

D302001 1.4 STEAM BOILERS

Provide steam boilers meeting the requirements of hot water boilers, except as follows. Steam boilers to meet the following thermal (Et) or combustion (Ec) efficiencies: Natural Gas-fired Steam (excluding natural draft) rated at 88 kW (300,000 Btuh) capacity and larger, Et = 79 percent; Natural Draft Steam rated at 88 kW (300,000 Btuh) capacity and larger, Et = 77 percent; #2 Oil-fired Steam rated at 88 kW (300,000 Btuh) capacity and larger, Et = 81 percent.

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.

D302002 FURNACES

Provide manufacturer's standard, self-contained, indirect, forced-air type. Furnace and furnace components to be completely factory-assembled and consist of a heat exchanger; burner; centrifugal blower, a sheet metal cabinet-type casing with provisions for duct, vibration isolators, and all required operating, limit, and safety controls. Furnace casing to be factory insulated and compatible with the operating temperatures. Furnace to be provided with removable service panels which allow access to all internal components requiring cleaning, servicing, or adjustment. Provide a 24 volt control transformers, high temperature limit, and fan time delay relay. Design to supply heated air through a ducted system. If required in ESR D30,

provide cooling evaporator coil module with cabinet suitable for use with furnace.

D302002 1.1 GAS-FIRED FURNACES

Furnace conforming to ANSI Z21.47/CSA 2.3. Furnace design to be certified by the AMERICAN GAS ASSOCIATION LABORATORIES (AGA). If a conventional type furnace is required in ESR D30, and the capacity is less than 65.9 kW (225,000 Btuh), the furnace must have a minimum AFUE of 78 percent. FEMP requires gas-fired warm air furnaces with a capacity greater than 65.9 kW (225,000 Btuh) have a minimum thermal efficiency of 80 percent at the maximum rated capacity. For residential applications, Energy Star requires warm air furnaces with capacity less than 65.9 kW (225,000 Btuh) have a minimum AFUE of 90 percent for US South applications, and a minimum AFUE of 95 percent for US North applications. Refer to Energy Star "Furnaces Key Product Criteria" for identification of US North and US South applications.

D302002 1.1.1 Gas-Burning Components

Gas-burning equipment to include the gas burners, ignition equipment, gas-control valve, gas piping, gas-pressure regulating valve, when applicable, and accessories necessary for a fully automatic system that is listed in CSA Directory. Gas-fired units equipped with programming controls to be furnished both with high and with low gas supply pressure switches in the fuel supply piping.

D302002 1.1.2 Ignition System

Ignition systems to be automatic electric ignition with electrically-ignited proven pilots. Continuous pilots are not permitted. Burner to be designed in accordance with NFPA 54 and located so that parts are protected against overheating. Provisions to be made in the burner housing for inspection of the pilot flame.

D302002 1.2 OIL-FIRED FURNACES

Furnace conforming to UL 727. Oil-fired furnaces with a capacity less than 65.9 kW (225,000 Btuh) require a minimum AFUE of 78 percent. FEMP requires oil-fired warm air furnaces with a capacity greater than 65.9 kW (225,000 Btuh) have a minimum thermal efficiency of 81 percent at the maximum rated capacity. For residential applications, Energy Star requires oil-fired warm air furnaces with capacity less than 62.9 kW 225,000 Btuh have a minimum AFUE of 85 percent.

D302002 1.2.1 Oil-Burning Components

The equipment to include the oil burner motor, ignition equipment safety devices, and accessories necessary for a full automatic system that conforms to UL 296. Oil-fired units equipped with programming controls to be furnished with low oil-pressure switches in the fuel supply piping. Oil-fired units not equipped with programming controls to be equipped with a delayed opening oil shutoff valve. The valve must automatically delay delivery of

oil to the burner until such time as the combustion air fan and, when applicable, the induced draft fan is operating at rated speed.

D302002 1.2.2 Ignition System

Ignition systems for oil-fired units to be of the direct-electrical spark type or interrupted type in accordance with UL 296.

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

Provide air-cooled chillers of type indicated in Project Program and meet the requirements of AHRI 550/590. For electric air cooled chillers use minimum full load and part load efficiency ratings specified by ASHRAE 90.1-2013 Table 6.8.1-3. Provide control panel with the manufacturers' standard controls and protection circuits. If

DDC system is required in project, provide a control interface for remote monitoring of the chiller's operating parameters, functions and alarms from the DDC control system central workstation. When using BACnet communication protocol, use the ASHRAE 135 protocol without gateways to interface with the BACnet DDC system in specifications UFGS 23 09 00, UFGS 23 09 23.02, and UFGS 23 09 13.

D303001 1.1.1 Stages

Provide continuous variable speed compressor adjustment to match actual load, or minimum of four stages of unloading at 25 percent per stage minimum for 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. For electric water cooled positive displacement chillers less than 300 tons use minimum full load and part load efficiency ratings specified by ASHRAE 90.1-2013 Table 6.8.1-3. For electric water cooled positive displacement chillers greater than 300 tons and electric water cooled centrifugal chillers, use minimum full load and part load efficiency ratings specified by FEMP, which is located at the following DOE FEMP webpage: http://energy.gov/eere/femp/covered-product-category-water-cooled-electric-chillers . Provide control panel with the manufacturers' standard controls and protection circuits. If DDC system is required in project, provide a control interface for remote monitoring of the chiller's operating parameters, functions and alarms from the DDC control system central workstation. Provide automatic capacity-reduction system for stable operation from 100 to 10 percent of full load capacity. When using BACnet protocol, use the ASHRAE 135 protocol without gateways to interface with the BACnet DDC system in specifications 23 09 00, 23 09 23.02, and 23 09 13.

D303001 1.3 COOLING TOWERS

Factory assembled, conforming to NFPA 214. Fire hazard rating for plastic impregnated materials must not exceed 25. Provide Cooling Technology Institute 201 certification of tower capability and performance. Cooling Tower performance must meet or exceed that listed in ASHRAE 90.1. Construct as indicated in ESR Section D30 with fill material of PVC formed sheets. Provide stainless steel hardware. Provide vibration cutout switch interlocked with the fan motor. Provide 2-speed or adjustable frequency drive fan motors. Provide work

platform(s) at all locations in the tower that require periodic maintenance. For multi-cell installations, provide isolation valves on inlets and outlets of each cell. Provide eliminators in the tower outlet to limit drift loss to not over 0.002 percent of the circulating water rate for counterflow towers, or 0.005 percent of the circulating water rate for cross-flow towers. Eliminators to be constructed of not less than 3/8 inch (10 mm) lumber or polyvinyl chloride (PVC).

D303001 1.4 CLOSED CIRCUIT COOLERS

Factory assembled, conforming to NFPA 214. Fire hazard rating for plastic impregnated materials must not exceed 25. Provide Cooling Technology Institute 201 certification of tower capability and performance. Cooler performance must meet or exceed that listed in ASHRAE 90.1. Provide stainless steel hardware. Provide vibration cutout switch interlocked with the fan motor. Provide 2-speed or adjustable frequency drive fan motors. Meet OSHA safety requirements for stairs and handrails.

D303002 DIRECT EXPANSION SYSTEMS

If coatings are indicated in ESR Section D30, provide with copper tube/copper fin construction or immersion applied, baked phenolic or other approved coating that passes the 3000 hour salt spray resistance test using the ASTM B117 procedure. Field applied coatings are not acceptable.

D303002 1.1 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. Equipment to be Energy Star Qualified, and heat pumps must include the Energy Star label affixed to the equipment. For small (less than 65,000 Btuh) air-cooled heat pumps, Energy Star requires a minimum 14 SEER, 11 EER, and 8.0 HSPF. For medium (65,000 to 135,000 Btuh) air-cooled heat pumps, Energy Star requires a minimum 11.3 EER, 11.4 IEER, and 3.35 COP. For large (136,000 to 240,000 Btuh) air-cooled heat pumps, Energy Star requires a minimum 10.9 EER, 11 IEER, and 3.35 COP. Provide manufacturer's minimum recommended clearance around condensing units. Size refrigerant piping in accordance with 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 must 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. In compliance with FEMP/Energy Star requirements, water-to-air closed loop units to have a minimum EER of 17.1 and COP of 3.6. Water-to-air open loop units to have minimum EER of 21.1 and COP of 4.1. Water-to-water closed loop units to have a minimum EER of 16.1 and minimum heating performance COP of 3.1; water-to-water open loop units to

have a minimum EER of 20.1 and a minimum heating performance COP of 3.5.

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 must 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 must be connected to the heat exchanger by a closed loop ground source vertical well field. In compliance with FEMP/Energy Star requirements, water-to-air closed loop units to have a minimum EER of 17.1 and minimum heating performance COP of 3.6. Water-to-water closed loop units to have a minimum EER of 16.1 and minimum heating performance COP of 3.1. Design and install each well field in accordance 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. Condensing units with capacities greater than or equal to 135,000 Btuh to meet the minimum efficiency requirements specified by ASHRAE 90.1-2013 Table 6.8.1-1 "Electrically Operated Unitary Air Conditioners and Condensing Units". Provide manufacturer's minimum recommended clearance around condensing units. Size refrigerant piping in accordance with the manufacturer's recommendations.

D303002 1.3 DX VARIABLE AIR VOLUME (VAV) UNITS

Direct expansion equipment to be specifically designed and manufactured for VAV applications. Central air handling units, VAV boxes/zone dampers and zone controls are to be provided by the same manufacturer.

D303002 1.3.1 Changeover-Bypass VAV Units

Provide the changeover-bypass VAV system with a constant-volume supply fan, and duct mounted zone control damper units with integral control boxes, designed for use with DX VAV packaged systems. A bypass duct and bypass damper diverts (bypasses) supply air not required by the zones back to the return duct by modulating the bypass damper to maintain the supply duct static pressure setpoint. Airflow through the evaporator coil must not be modulated.

D303002 1.3.2 Variable Air Volume Units

Provide the variable air volume (VAV) system with a variable speed supply fan, variable speed compressors, and pressure independent zone VAV boxes/units. The supply fan varies speed to modulate the supply airflow to maintain the supply duct static pressure setpoint, while the variable speed compressors modulate to maintain discharge air temperature setpoints as the airflow through the evaporator coil is modulated.

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. Size refrigerant piping in accordance with the manufacturer's recommendations. Insulate refrigerant piping suction lines and condensate drain.

D303002 1.4.1 Light Commercial Air Conditioner, Three-Phase, Ductless Split Systems

In order to meet Energy Star requirements, ductless split system air conditioners smaller than 65,000 Btuh require a minimum SEER of 14 and EER of 12; ductless split system air conditioners that have an electric resistance heating section (or no heating) and are sized from 65,000 Btuh up to 240,000 Btuh to have an EER of 11.7 and an IEER of 11.8; all other air conditioners sized from 65,000 Btuh up to 240,000 Btuh to have an EER of 11.5 and IEER of 11.6.

D303002 1.4.2 Light Commercial Heat Pump, Three-Phase, Ductless Split Systems

In order to meet Energy Star requirements, ductless split system heat pumps smaller than 65,000 Btuh require a minimum SEER of 14, EER of 11, and HSPF of 8.2; ductless split system heat pumps that have an electric resistance heating section (or none) and are sized from 65,000 Btuh up to 135,000 Btuh to have an EER of 11.3, an IEER of 11.4, and a COP of 3.35 (rated at 47 deg F); ductless split system heat pumps that have an electric resistance heating section (or none) and are sized from 135,000 Btuh up to 240,000 Btuh to have an EER of 10.9, an IEER of 11, and a COP of 3.25 (rated at 47 deg F).

D303002 1.5 VARIABLE REFRIGERANT FLOW SYSTEMS

Provide a complete system consisting of VRF heat pump units, branch circuit controllers, VRF fan coil units, and associated controls. Provide inverter driven heat pump units that utilize R410A refrigerant. In order to meet Energy Star requirements, heat pumps smaller than 65,000 Btuh require a minimum SEER of 14, EER of 11, and HSPF of 8.2; heat pumps that have an electric resistance heating section (or none) and are sized from 65,000 Btuh up to 135,000 Btuh to have an EER of 11.3, an IEER of 11.4, and a COP of 3.35 (rated at 47 deg F); heat pumps that have an electric resistance heating section (or none) and are sized from 135,000 Btuh up to 240,000 Btuh to have an EER of 10.9, an IEER of 11, and a COP of 3.25 (rated at 47 deg F). On the branch circuit controllers, include multiple branch connections allowing for simultaneous heating and cooling utilizing hot gas refrigerant or sub-cooled liquid. The total capacity of the branch controllers must be between 50 and 150 percent of the rated capacity.

Size and install refrigerant piping in strict compliance with the manufacturer's requirements. Refrigerant piping must be clean, dry, and leak free. Prior to installation all refrigerant pipes must remain

sealed. During installation and prior to filling, use nitrogen to maintain cleanliness and prevent oxidation and scaling while brazing. Install each system to provide proper oil return. Refrigerant piping must be copper, ACR type, ASTM B280. All joints must be sil-brazed. All thicknesses of piping must remain the same throughout the system. Individually pressure test and commission each refrigerant circuit. Perform pressure testing using nitrogen at 1-1/2 times the system operating pressure. Design each system to meet Refrigerant Piping and Heat Transfer Components ASME B31.9, Building Services Piping Code and design to allow for expansion and contraction.

D3040 DISTRIBUTION SYSTEMS

D304001 AIR DISTRIBUTION, HEATING & COOLING

D304001 1.1 DUCTWORK

Except as specified herein, provide ductwork constructed, braced, reinforced, installed, supported, and sealed in accordance with SMACNA standards.

D304001 1.1.1 Flexible Ducts

Use insulated flexible duct only for connections to air distribution devices to adapt to minor offsets. Flexible duct must be UL 181 listed and in conformance with SMACNA 1966 duct construction standards with a minimum R value of 4. Limit flexible ductwork to maximum of 5 feet (1.5 meters) in length.

D304001 1.1.2 Flexible Connections

Provide flexible connectors between fans and ducts.

D304001 1.1.3 Volume Dampers

Provide manual volume dampers in each branch take-off from the main duct to control air quantity except for primary supply ductwork on VAV systems. Dampers must conform to SMACNA 1966 duct construction standards and must be seal class "A" construction.

D304001 1.1.4 Fire Dampers

Fire dampers must be rated in accordance with UL 555. Fire dampers must be dynamic type rated for closure against a moving airstream. Provide fire dampers that do not intrude into the air stream when in the open position.

D304001 1.1.5 Smoke Dampers

Smoke dampers must be rated in accordance with UL 555S.

D304001 1.1.6 Sound Attenuators

Fabricated attenuators that will reduce the rated sound pressure level of the fan down to at least 65 decibels in the 250 Hz

(third octave band) center frequency by using a reference sound source calibrated in decibels of sound power at 10 to 12 watts. Maximum permissible pressure drop must not exceed 0.63 inch of water (157 Pa).

D304001 1.2 LOUVERS & HOODS

D304001 1.2.1 Louvers

Louvers must bear AMCA ratings seal for air performance and water penetration in accordance with AMCA 500L and AMCA 511. Louvers must be constructed of anodized aluminum alloy or stainless steel. Provide birdscreens.

D304001 1.2.2 Hoods

Hoods must 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 must be rolled, or otherwise stiffened and rounded.

D304001 1.4 INSULATION

Provide external thermal insulation for all ductwork. Insulate ductwork in concealed spaces with blanket flexible mineral fiber. Insulate ductwork in Mechanical Rooms and exposed locations with rigid mineral fiber insulation.

Provide insulation with factory applied all-purpose jacket with integral vapor retarder. In exposed locations, provide a jacket with white surface suitable for painting. Flame spread/smoke developed rating for all insulation must not exceed 25/50. Minimum insulation thickness must be the minimum thickness required by ASHRAE 90.1. Insulate the backs of all supply air diffusers with blanket flexible mineral fiber insulation.

D304001 1.5 VAV BOXES

Pressure-independent type variable air volume units rated in accordance with AHRI 880. Boxes must not be allowed to fully shut-off. Provide each box with a heating coil unless not required by space reheat or heating. Provide electronic controls.

D304001 1.6 VARIABLE AIR VOLUME VAV FAN-POWERED UNITS

Pressure-independent, fan powered, VAV units rated in accordance with AHRI 880 and UL listed. Provide each box with a heating coil. Provide electronic controls with speed controller, discharge volume control damper(s), and return/recirculation air frame and filter. If discharge dampers are not provided with the unit, coordinate installation with the sheet metal contractor. Insulate in accordance with ASHRAE 90.1.

D304002 STEAM DISTRIBUTION SYSTEMS

D304002 1.1 STEAM PIPING

ASTM A 106/A 106M or ASTM A 53/A 53M Grade B, Schedule 40, black steel, electric-resistance welded or seamless.

D304002 1.2 CONDENSATE RETURN PIPING

ASTM A 106/A 106M or ASTM A 53/A 53M, Grade B, Schedule 80, black steel, electric-resistance welded or seamless.

D304002 1.3 STEEL PIPE FITTINGS

For piping 2 inch (50 mm) and smaller, provide ASME B16.3 malleable iron screwed fittings or ASME B16.11 socket welding (Class 3000) or threaded type (Class 2000). Provide ASME B16.9 butt-welding fittings or ASME B16.5 flanged type for piping 2-1/2 inch (63 mm) and larger.

D304002 1.4 INSULATION

Insulate steam and condensate return piping with mineral fiber or cellular glass insulation with all-purpose jacket.

D304002 1.5 STEAM PRESSURE REDUCING STATION

For each building, provide steam pressure reducing station(s).

D304002 1.6 STEAM TRAPS

Provide steam traps and accessories in accordance with UFC 3-401-01.

D304003 HOT WATER DISTRIBUTION SYSTEMS

D304003 1.1 HOT WATER PIPING

Electric resistance welded or seamless Schedule 40 black steel pipe conforming to ASTM A 53/A 53M. Piping 4 inch (100 mm) and smaller may be ASTM B 88 Type K or L copper.

D304003 1.2 STEEL PIPE FITTINGS

For piping 2 inch (50 mm) and smaller, provide ASME B16.3 malleable iron screwed fittings or ASME B16.11 socket welding (Class 3000) or threaded type (Class 2000). Provide ASME B16.9 butt-welding fittings or ASME B16.5 flanged type for piping 2-1/2 inch (63 mm) and larger.

D304003 1.3 COPPER FITTINGS

ASME B16.18 cast bronze solder joint type or ASME B16.22 wrought copper solder joint type.

D304003 1.4 ISOLATION VALVES

Provide isolation valves on supply and return lines at take-offs for service to each building(s). Locate valves in valve boxes.

D304003 1.5 INSULATION

Insulate hot water piping with mineral fiber insulation with factory-applied all-purpose jacket. Provide aluminum metal wrap over insulation for all exterior piping.

D304003 1.6 VALVES

Provide shut off valves, appropriately sized relief valves, and appropriately sized balancing valves as necessary to balance water flows, protect components and isolate equipment for service and repairs.

D304003 1.7 APPURTENANCES

Provide appurtenances such as air separators, expansion tanks, suction diffusers, strainers, and other required features to allow for proper operation of hot water systems.

D304003 1.8 TEST PORTS

Provide test ports in piping at inlet and outlet of all major system components including boilers, pumps, and other equipment as required.

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 must be electric resistance welded or seamless Schedule 40 black steel pipe conforming to ASTM A 53/A 53M. Piping 4 inch (100 mm) and smaller may be ASTM B 88 Type K or L copper.

D304006 1.2 STEEL PIPE FITTINGS

For piping 2 inch (50 mm) and smaller, provide ASME B16.3 malleable iron screwed fittings or ASME B16.11 socket welding (Class 3000) or threaded type (Class 2000). Provide ASME B16.9 butt-welding fittings or ASME B16.5 flanged type for piping 2-1/2 inch (63 mm) and larger.

D304006 1.3 COPPER FITTINGS

ASME B16.18 cast bronze solder joint type or ASME B16.22 wrought copper solder joint type.

D304006 1.4 ISOLATION VALVES

Provide isolation valves on supply and return lines at take-offs for service to each building(s). Locate valves in valve boxes.

D304006 1.5 INSULATION

Insulate chilled water pumps and accessories for the temperature and

service in rigid block, semi-rigid board, or flexible unicellular insulation to fit as closely as possible to equipment. Insulate above ground chilled water piping with cellular glass insulation (ASTM C 552, Type II, and Type III). 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

AMCA 210 certified, with AMCA seal. Fan bearings must have a minimum average life of 200,000 hours at design operating conditions. Provide bird screens for outdoor inlets and outlets. Provide direct-drive type fans with means for verifying operation via the building DDC system or with speed controllers

D304007 1.2 IN-LINE FANS

UL-Listed centrifugal fans.

D304007 1.3 WALL FANS

Propeller fans with fan guards. Provide centrifugal fans with backdraft dampers and wall bracket.

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 must be 160 cfm with maximum sound level of 5.6

sones.

D304008 AIR HANDLING UNITS

AMCA 210 certified fans with AMCA seal. Fan bearings must have a minimum average life of 200,000 hours at design operating conditions. Provide bird screens for outdoor inlets and outlets.

D304008 1.1 CENTRAL STATION AIR HANDLERS

Modular construction, double wall air handling units with minimum of 1 inch (25 mm) casing insulation. Provide AHRI 430 certified fans and AHRI certified coils. Provide stainless steel, positive draining condensate drain pan. For 100 percent outside air units provide capability for cooling, heating, dehumidification and reheat.

D304008 1.1.1 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 must be of the lowest possible reflected and shadowed losses. Energy Efficiency - high efficiency electronic type power supplies 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 must not be less than 820 ÂµW/cm2 at the closest point and through placement, not less than 60 percent 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 - install emitters and fixtures 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. Provide one complete set of spare bulbs.

D304008 1.1.2 Dedicated Outside Air System (DOAS)

Provide package or modular air handling unit specifically designed for conditioning 100% outside air. Provide controls and hardware necessary for controlling ventilation air to the point of use at a specific dry bulb temperature and relative humidity. Provide with supply and exhaust/return fan with heat recovery element if called for. Provide with DX or chilled water cooling/dehumidification coil. Provide with modulating hot refrigerant gas or hot water reheat coil.

D304090 OTHER DISTRIBUTION SYSTEMS

D304090 1.1 PUMPS

Centrifugal circulating pumps with motor, motor starter, and motor enclosure conforming to the appropriate NEMA standards. Provide suction diffusers on base-mounted pumps. Insulate pumps used for hot service and chilled water service.

D304090 1.1.1 In-Line Pumps

Pumps constructed of manufacturer's standard materials suitable for chilled, condenser, and hot water heating systems.

D304090 1.1.2 Base Mounted Pumps

Single stage end suction pumps suitable for chilled, condenser, and hot water heating systems.

D304090 1.2 VARIABLE FREQUENCY DRIVES (VFD)

Factory-assembled variable frequency drive control systems for variable speed control. Provide all air handling unit and pump VFD's from the same manufacturer. Each VFD must include motor starter, motor disconnects and controls as required for a complete system. Units must be UL-listed and comply with the National Electric Code.

Provide the following accessories:

Disconnect switch

Control circuit transformer, with primary and secondary fuses

Manual bypass

System hand-off-auto switch with provisions for remote start/stop of the system.

System initialized light

Run light

Failure alarm

LCD digital display with numeric keypad

Provide a control interface for remote monitoring of VFD functions and alarms from the DDC control system computer.

D304090 1.3 AIR SEPARATORS

ASME rated air separators with tangential inlet and outlet connections and automatic air vent.

D304090 1.4 SOLIDS SEPARATORS

Provide centrifugal solids separator with automatic drain in open systems.

D304090 1.5 EXPANSION TANKS

ASME rated expansion tanks with polypropylene or butyl diaphragm or compression tanks as indicated in UFC 3-401-01.

D304090 1.6 MAKE-UP WATER STATION

Provide station consisting of a water pressure-reducing valve and a relief valve in the make-up water line to the chilled and hot water systems to maintain the operating pressure. Provide a 3/4 inch (20 mm) globe valve by-pass around this pressure reducing station. Provide reduced pressure backflow preventer upstream of the by-pass.

D304090 1.7 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 must be rated for use with pressures up to 130 PSI (900 kPa) (gage). Provide condenser water systems with automatic chemical treatment systems that monitor conductivity, and pH, and provide for water metering and bleed-off. Provide chemicals in accordance with EPA and equipment manufacturer’s recommendations.

D304090 1.11 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 must be of a material suitable to protect the carrier pipe (two pipe sizes larger) and sealed with an appropriate flexible material. Provide fire stopping in fire rated walls in accordance with IBC.

D304090 1.13 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

Provide fin tube radiators and convectors 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

Provide one of the following as directed in ESR Section D30.

a. Provide Direct Digital Controls (DDC) to comply with the requirements specified in UFGS Sections 23 09 00, *Instrumentation and Control for HVAC*, 23 09 23.02, *BACnet Direct Digital Control for HVAC and Other Building Control Systems*, and 23 09 13, *Instrumentation and Control Devices for HVAC*.
b. Provide a partial direct digital control (DDC) system that will communicate with the existing DDC system. If using BACnet protocol, comply with the requirements specified in UFGS Sections 23 09 00, *Instrumentation and Control for HVAC*, 23 09 23.02, *BACnet Direct Digital Control for HVAC and Other Building Control Systems*, and 23 09 13, *Instrumentation and Control Devices for HVAC*. Notwithstanding any other provisions of this Contract, no other product will be acceptable other than that indicated in ESR Section D30. Provide a distributed control system. Integrate all new DDC points on the existing server providing a seamless logical flow from the existing facilities to the new integrated facility.
c. Provide and integrate Direct Digital Controls (DDC) in accordance with Part 3 Chapter 6 D306001 1.1 DIRECT DIGITAL CONTROLS in compliance with requirements specified in UFGS Sections 23 09 00, *Instrumentation and Control for HVAC*, 23 09 23.02, *BACnet Direct Digital Control for HVAC and Other Building Control Systems*, 23 09 13, *Instrumentation and Control Devices for HVAC*, and UFGS 25 10 10, *Utility Monitoring and Control System (UMCS) Front End and Integration*.

The Designer of Record must use UFGS Sections 23 09 00, 23 09 23.02, and 23 09 13 if using BACnet protocol, and submit the edited specification sections as a part of the project design submittal.

Design requirements must be in accordance with all specification notes and the BAS Owner must be identified and designated early in the design documentation.

System must include stand alone digital controllers, a communication network, and a workstation computer with control software. Provide stand-alone control routines that operate without connection to the network during a loss of communication. Provide trending, scheduling and alarm tables (may be included with the sequence of operation). Provide reset routines (based on outdoor air temperature or zone demand) for hot water loop temperature setpoints and supply air static

pressure control. Use alarming and trending services during performance testing or commissioning. Alarm every sequence routine when out-of-limits or control/response failure occurs. Display all graphic floor plans, equipment graphics, DDC ladder diagrams, and sequence of operations graphic pages.

All 120-volt wiring must comply with NFPA 70. All 24-volt wiring must comply with the IMC and terminal device manufacturer's recommendations.

Provide training on the installed system according to the maximum training days in UFGS 23 09 00, UFGS 23 09 23.02, and UFGS 23 09 13. Demonstrate all operator workstation functions requiring BACnet services, i.e., navigating through the graphic displays, trending, alarming and monitoring of the new controls system from the existing operator workstation using only the existing application software and without the need to launch other applications or logon to other vendor applications.

D306001 1.2 ELECTRONIC CONTROLS

If required, provide programmable thermostats with built in keypads for scheduling of day and night temperatures with two setback periods per day. Provide independent summer and winter programs. Thermostats must have temporary and manual override of schedule and battery backup.

D3070 SYSTEMS TESTING AND BALANCING

D3070 1.1 HVAC SYSTEM

Provide HVAC systems testing and balancing that complies with the requirements specified in UFGS Specification Section 23 05 93, *Testing, Adjusting, and Balancing for HVAC*. The Designer of Record must prepare UFGS Specification Section 23 05 93, as a part of the project specification and include the prepared specification section in the design submittal for the project.

D3090 OTHER HVAC SYSTEMS AND EQUIPMENT

D309001 GENERAL CONSTRUCTION ITEMS

D309001 1.1 SEISMIC DESIGN

Provide in accordance with UFC 3-401-01, *Mechanical Engineering*.

D309002 REFRIGERATION SYSTEMS

D309090 OTHER SPECIAL MECHANICAL SYSTEMS

D309090 1.1 ENERGY RECOVERY WHEELS

Total energy (enthalpy) type energy recovery wheels (heat wheels). Media must be aluminum or a lightweight polymer coated with a corrosion-resistant finish. Etched or oxidized surfaces are not acceptable. Heat transfer surfaces must be coated with a non-migrating (permanently bonded) absorbent specifically developed for the selective transfer of water vapor. Equal sensible and latent recovery

efficiencies must be documented through a certification program conducted in accordance with ASHRAE 84 and AHRI 1060. The energy recovery wheel must have an insulated housing of double wall construction, rotor seals that are specifically designed to limit cross-contamination, and a rotation detector. Should rotation stop, the rotation detector must alarm the HVAC control system. Filter sections must be readily accessible for maintenance.

D309090 1.2 HEAT PIPES

Factory fabricated, assembled and tested heat pipes with counter-flow arrangement. Provide hermitically sealed, seamless aluminum tube cores with extended surfaces. Heat exchanger frame must be constructed of not less than 16-gage galvanized steel and fitted with intermediate tube supports, and flange connections. Provide tube end covers and a partition of galvanized steel to separate exhaust and supply air streams without cross-contamination. A refrigerant must be used as the working fluid. Type I refrigerants are not allowed.

-- End of Section --

SECTION D40

FIRE PROTECTION
12/18

D40 GENERAL

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

D40 1.1 DESIGN GUIDANCE

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

D40 1.1.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC: UFC 3-600-01, Fire Protection Engineering for Facilities UFC 1-200-02, High Performance and Sustainable Building Requirements)

D40 1.2 QUALITY ASSURANCE

Materials and assemblies installed in the work must be inspected and found to be in compliance with industry standards and these specifications prior to acceptance of the work. Items found not to be in compliance must be removed, or corrective measures taken, to assure compliance with the referenced standard.

Submit Qualifications, Training Plans, and Test Plans and Procedures indicated herein 45 calendar days prior to the expected date of execution. Notify the Contracting Officer 14 calendar days prior to all testing. Submit test results within 7 calendar days of completion of testing.

D40 1.2.1 Qualified Workers

D40 1.2.1.1 Fire Protection Designer of Record

Services and qualifications of the FPDOR must be as specified in UFC 3-600-01 and UFC 3-600-10N. The FPDOR must review and approve all fire protection engineering submittals.

D40 1.2.1.2 Fire Protection Engineering Technicians

Workers required herein to be certified by the National Institute for Certification in Engineering Technologies (NICET) as an engineering technician in the Fire Protection Engineering Technology program must be thoroughly trained and experienced, and completely familiar with the specified requirements and the methods needed for proper performance of the work in this section. All documentation required to be submitted for record and/or approval must include the NICET engineering technician's signature, along with the technician's current NICET certification number, certification subfield, and level.

Installation drawings, shop drawings or working plans, calculations, other required pre-construction documentation and as-built drawings must be prepared by, or under the direct supervision of a NICET engineering technician as specified in Section 6 D40 of Part 3.

D40 1.2.1.3 Qualified System Installers

Fire Suppression System and Fire Alarm System installers must be regularly engaged in the installation of the type and complexity of system specified in the Contract documents, and have served in a similar capacity for at least three systems that have performed in the manner intended for a period of not less than 6 months.

Installers of Chlorinated Poly Vinyl Chloride (CPVC) sprinkler systems must be certified by the manufacturer and maintain a copy of their certification on hand at all times.

D40 1.2.1.4 Fire Protection QC Specialist

The Fire Protection (FP) QC Specialist must be a U.S. Registered Fire Protection Engineer (FPE) and be an integral part of the Prime Contractor's Quality Control Organization. This FPE cannot have any business relationships (owner, partner, operating officer, distributor, salesman, or technical representative) with any fire protection equipment device manufacturers, suppliers or installers for any such equipment provided as part of this project. The Fire Protection Designer of Record (FPDOR) may serve as the FPQC Specialist provided the following qualifications are met.

a. Qualifications/Experience: The FPQC Specialist must have obtained their professional registration by successfully completing the Fire Protection Engineering discipline examination. This FPE shall have a minimum of 5 years full time and exclusive experience in every aspect of facility design and construction as it relates to fire protection, which includes, but is not limited to, building code analysis, life safety code analysis, design of automatic detection and suppression systems, passive fire protection design, water supply analysis, and a multi-discipline coordination reviews, and construction surveillance.

b. Area of Responsibility: The FPQC Specialist is responsible for assuring the proper construction and installation of life safety and fire protection features across all disciplines and trades. The FPQC Specialist is responsible for assuring that life safety and fire protection features are provided in accordance with the design documents, approved construction submittals, and manufacturer's requirements. Examples include, but are not limited to, water distribution systems including fire pumps and fire hydrants, fire resistive assemblies such as spray-applied fire proofing of structural components and fire rated walls/partitions, fire alarm and detection systems, fire suppression and standpipe systems, and emergency and exit lighting fixtures.

c. Construction Surveillance: The FPQC Specialist must visit the construction site as necessary to ensure life safety and fire protection systems are being constructed, applied, and installed in accordance with the approved design documents, approved construction submittals, and manufacturer's requirements. Frequency and duration of the field visits are dependent upon particular system components, system complexity, and phase of construction. At a minimum, field visits must occur just prior to installation of suspended ceiling system to inspect the integrity of passive fire protection features and fire suppression system piping, preliminary inspections of fire alarm/detection and suppression systems, and final acceptance testing of fire alarm/detection and suppression systems. The FPQC Specialist must prepare a written report detailing compliance of any outstanding submittal review comments, summarizing the results of all tests, detailing all discrepancies discovered, corrective action taken, all forms as required by the respective NFPA codes, and recommendations/certifications for acceptance. Forward one copy of the report with attachments to the Naval Facilities Engineering Command Fire Protection Engineer.

D40 1.2.2 Performance Verification Testing

Operational tests are required on all systems to demonstrate compliance with contract requirements and respective NFPA codes, International Building Code and as noted below. Test procedures must be in full compliance with the respective NFPA codes, the equipment manufacturer recommendations, and UFC 3-600-10N. Provide all personnel, equipment, and materials for tests. Return trips to witness repeat acceptance tests due to failure of previous tests will be at the Contractor’s expense.

D40 1.2.2.1 Preliminary Inspections and Final Acceptance Testing

The FPQC Specialist must personally witness all preliminary inspections of fire alarm/detection and suppression systems. Once preliminary inspections have been successfully completed, the FPQC Specialist must submit a signed certificate to the QC Manager that systems are ready for final inspection and testing. The Naval Facilities Engineering Command Fire Protection Engineer will witness formal tests and approve all systems before they are accepted. The QC Manager must submit the request for formal inspection at least 15 days prior to the date the inspection is to take place. The QC Manager must provide 10 days advance notice to the Contracting Officer and the activity Fire Inspection Office of scheduled final inspections.

D40 1.2.2.2 Final Life Safety/Fire Protection Certification

The FPQC Specialist must provide certification that all life safety and fire protection systems have been installed in accordance with the contract documents, approved submittals, and manufacturer's requirements. This certification is to summarize all life safety and fire protection features, and must bear the professional seal of the FPQC Specialist.

D40 1.2.2.3 System Manufacturers Representatives

The systems manufacturer technical representative must be present for the final inspection and test for the following systems: fire alarm and detection, fire pump, carbon dioxide, foam generating and clean agent extinguishing.

D40 1.2.2.4 Fire Suppression Water Supply and Equipment

Inspect fire hydrants prior to backfilling the trench surrounding the fire hydrants. Provide a report, including pictures, to the Contracting Officer.

Conduct fire pump tests in the presence of the pump, controller, and engine manufacturer technical representatives. The fire pump manufacturer's representative must also be present for the preliminary test of the fire pump system.

D40 1.2.2.5 Kitchen Hood Fire Extinguishing Systems

The kitchen hood fire extinguishing system must 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

Provide training for the active systems within 6 weeks of final acceptance of the systems. Schedule the training at least 2 weeks in advance.

D40 1.3 DESIGN SUBMITTALS

Submit design submittals in accordance with Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps 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) must approve the following construction submittals as a minimum:

All fire protection engineering submittals including:

a. Shop Drawings. Provide shop drawings for all systems.
b. Product Data. Provide product data for all equipment.
c. Design Data. Provide design data for all system calculations.
d. Test Reports
e. Certificates

D4010 FIRE ALARM AND DETECTION SYSTEMS

D401001 FIRE ALARM DISTRIBUTION

D401001 1.1 REMOTE ANNUNCIATORS

Remote annunciators must have a minimum 80 character alphanumeric display with alarm acknowledge, alarm silence, and reset functions.

D401001 1.2 TRANSMITTED SIGNALS

Provide the following signals to be sent to the fire alarm receiving station:

a. Sprinkler Water Flow
b. Smoke Detector
c. Manual Pull Station
d. Supervisory (i.e., valve tamper switch, fire pump loss of power,

fire pump phase reversal)
e. Duct Smoke Detector
f. Fire Pump Running
g. Sleeping Room Smoke Detector

D4020 FIRE SUPPRESSION WATER SUPPLY AND EQUIPMENT

D402001 FIRE PROTECTION WATER PIPING AND EQUIPMENT

The design point of connection to the existing water supply requires the approval of the Contracting Officer. The FP DOR must conduct additional flow tests after contract award prior to any design submissions. Conduct tests under the supervision of the Contracting Officer.

D4040 SPRINKLERS

D404001 SPRINKLERS & RELEASING DEVICES

D404001 1.1 DESCRIPTION

Provide a dry pipe system for areas subject to freezing. Loading docks may be protected with dry-type sidewall sprinklers supplied by the wet-pipe system.

D404001 1.2 REQUIREMENTS

Utilize upright sprinklers with ordinary temperature rating and color to match finish in normally occupied rooms without a finished ceiling (i.e., laboratories, and other spaces with exposed ceilings).

D4090 OTHER FIRE PROTECTION SYSTEMS

D409001 CARBON DIOXIDE SYSTEMS

Supply system must include storage cylinders, racks, manifolds, beam scales, and associated equipment. Arrange the primary cylinders for automatic discharge upon activation of the main control, and the secondary cylinders for discharge both manually and upon no discharge from the primary cylinders.

D409002 FOAM GENERATING EQUIPMENT

D409002 1.1 SYSTEM CRITERIA

Foam fire protection systems must incorporate the necessary elements for foam storage, pumping, piping, proportioning, delivery, and detection, activation and alarm systems.

D409002 1.2 SYSTEM OPERATION

Once activated, foam system(s) must operate until shut down manually. Provide separate circuits from the releasing control panel to each zone of initiating devices. Transmission of signals from more than one zone over a common circuit is prohibited.

D409002 1.3 AFFF CONCENTRATE PUMPS

The foam concentrate pump must be positive displacement, electric motor driven, drip proof, 240/480 volts, 60 Hz AC. System operation must be fully automatic, with manual over-ride and manual shutdown.

D409002 1.4 FOAM CONCENTRATE STORAGE TANK

Provide a gage or unbreakable sight glass to permit visual determination of level of tank contents, unless liquid level is clearly visible through shell of tank.

D409002 1.5 LOW-LEVEL LOW-EXPANSION FOAM SYSTEM

D409002 1.5.1 Discharge Devices

Where used the low-level AFFF nozzle system must utilize the Viking Grate Nozzle TM, Model GN 200 (or equivalent that is acceptable to the NAVFAC Chief Fire Protection Engineer for this use).

D409002 1.5.2 Test Header

Where used a foam system test header connection with integral gate valves must be located at each foam system riser. Install sufficient 2-1/2 inch (65 mm) male National Standard hose threads, with cap and chain, to allow testing of the riser at the design flow rate. Provide a wall escutcheon plate with "FOAM TEST HEADER" in raised letters cast in plate.

D409002 1.6 AUTOMATIC WATER CONTROL VALVE ASSEMBLY (DELUGE VALVE)

Where used, the water control valve must be an electrically actuated type. Valve must be resettable without opening the valve. Solenoid valve to be of the normally closed, de-energized type, which opens when energized upon receipt of an electrical signal from the releasing control panel to which it is connected. Solenoid valves used with diaphragm-type valves must be rated for a maximum pressure differential of 175 psi (1207 kPa). Water control valves used for low-level foam systems shall be capable of recycling to the closed position at an adjustable speed. Valves located in hazardous locations must be approved for the hazard classification of the area where located.

D409002 1.7 FOAM SYSTEM RELEASING CONTROL SYSTEM

D409002 1.7.1 Manual Releasing Stations

Where used the units must be dual-action type located inside a clear plastic tamper cover that requires lifting prior to actuating the station. Any lettering on the cover must be "FOAM"; the words "fire" or "fire alarm" are not allowed on the cover. The station must not require the breaking of glass to actuate. Operating instructions are to be clearly marked on the station cover. Unit must be compatible with the control panel to which it is connected. Operation of a station must result in immediate release of the foam system for that space.

D409002 1.7.2 Flame Detectors

Where used flame detectors must operate on the infrared (IR) principle. Detector must employ three IR sensors to provide multi-spectrum detection. Each detector to have a manufacturer's swivel mounting bracket. Locate a permanent engraved rigid plastic or metal label at each detector with detector aiming information (degrees horizontal and vertical) for the corresponding detector.

D409002 1.7.3 Abort Switch

Where used a foam release abort switch must be installed adjacent to each manual releasing station and at the releasing panel and be properly labeled (Minimum 1Â½ inch high lettering stating: "CONTINUOUS OPERATION OF SWITCH WILL ABORT FOAM FLOW UNTIL SYSTEM IS RESET". Switch must be deadman type which when depressed ceases flow of foam solution (both water and foam concentrate). Upon release of the switch, the system must return to its previous operational state. Switch and wiring must be supervised.

D409003 CLEAN AGENT SYSTEMS

D409003 1.1 SYSTEM INSTALLATION

The system must be supplied and installed by a factory-authorized distributor. The distributor must be trained by the manufacturer to design, install, test, and maintain the system and be able to provide proof of training upon request.

D409003 1.2 RELEASING CONTROL SYSTEM

Where provided manual release stations must be dual-action type located inside a clear plastic tamper cover that requires lifting prior to actuating the station. The words "fire" or "fire alarm" are not allowed on the cover. The station must not require the breaking of glass to actuate. Operating instructions are to be clearly marked on the station cover. Unit must be compatible with the control panel to which it is connected. Operation of a station must result in immediate release of the clean agent system for that space.

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
09/22

D50 GENERAL

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

D50 1.1 NARRATIVE

This section covers installations inside the facility and out to the five foot line. See PTS Section G40, *Site Electrical*, for continuation of systems beyond the five foot line.

D50 1.2 ELECTRICAL DESIGN GUIDANCE

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

When all product Quality Control information is included in the Unified Facility Criteria (UFC) and there are requirement options identified in the ESR, then the Uniformat Level 4 titles (and possible subtitles) are included without additional verbiage. One example of this is D501090, OTHER SERVICE AND DISTRIBUTION.

D50 1.2.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s): UFC 3-501-01, Electrical Engineering)
UFC 1-200-02	High Performance and Sustainable Building Requirements
UFC 3-580-10	Navy and Marine Corps Intranet (NMCI) Standard Construction

Practices

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS 26 08 00	Apparatus Inspection and Testing
UFGS 26 20 00	Interior Distribution System
UFGS 26 23 00	Low-Voltage Switchgear
UFGS 26 24 13	Switchboards
UFGS 26 29 23	Adjustable Speed Drive (ASD) Systems Under 600 Volts
UFGS 26 32 15.00	Engine-Generator Set Stationary 15-2500 kW, with Auxiliaries
UFGS 26 33 53	Static Uninterruptible Power Supply (UPS)
UFGS 26 35 43	400-Hertz (Hz) Solid State Frequency Converters
UFGS 26 36 23	Automatic Transfer Switches and By-pass/Isolation Switch
UFGS 26 41 00	Lightning Protection System
UFGS 26 51 00	Interior Lighting
UFGS 27 10 00	Building Telecommunications Cabling System
UFGS 28 10 05	Electronic Security Systems (ESS)

D50 1.3 QUALITY ASSURANCE

Submit Qualifications, Certifications, and Test Plans indicated herein 45 calendar days prior to the expected date of execution. Notify the Contracting Officer 14 calendar days prior to all testing. Submit test results within 7 calendar days of completion of testing.

The Designer of Record is responsible for approving the submittals listed below.

D50 1.3.1 Qualified Testing Organization

Engage the services of a qualified testing organization to provide inspection, testing, calibration, and adjustment of the electrical distribution system and equipment listed in paragraph entitled "Acceptance Tests and Inspections" herein. Organization

must be independent of the supplier, manufacturer, and installer of the equipment. The organization must be a first tier subcontractor.

Submit name and qualifications of organization. Organization must have been regularly engaged in the testing of electrical materials, devices, installations, and systems for a minimum of 5 years. The organization must have a calibration program, and test instruments used must be calibrated in accordance with NETA ATS.

Submit name and qualifications of the lead engineering technician performing the required testing services. Include a list of three comparable jobs performed by the technician with specific names and telephone numbers for reference. Testing, inspection, calibration, and adjustments must be performed by an engineering technician, certified by NETA or the National Institute for Certification in Engineering Technologies (NICET) with a minimum of 5 years' experience inspecting, testing, and calibrating electrical distribution and generation equipment, systems, and devices.

D50 1.3.2 NEC Qualified Worker

Provide in accordance with NFPA 70. Qualified Workers are allowed to be assisted by helpers on a 1 to 1 ratio, provided such helpers are registered in recognized apprenticeship programs. Submit a certification confirming NEC Qualified Worker requirements.

D50 1.3.3 Qualified PV Installer

Installation of photovoltaic (PV) systems must be performed by experienced and trained installers. At minimum the PV installation supervisor must hold a "PV Installer Certification" as issued by the North American Board of Certified Energy Practitioners (NABCEP) and hold a Certified Solar Roofing Professional (CSRP) credential issued by RISE "Roof Integrated Solar Energy Inc".

D50 1.3.4 Qualified Telecommunications Worker

All installers assigned to the installation of telecommunications systems or any of its components must be Building Industry Consulting Services International (BICSI) Registered Cabling Installation Technicians or have a minimum of 3 years experience in the installation of the specified copper and fiber optic cable and components. Include names and locations of two projects successfully completed using optical fiber and copper communications cabling systems. Include written certification from users that systems have performed satisfactorily for not less than 18 months. Include specific experience in installing and testing structured telecommunications distribution systems using optical fiber and Category 5e cabling systems.

D50 1.3.5 Material Standards

Ensure service support and provide manufacturer's nameplate in accordance with PTS Section Z10, *General Performance Technical Specification*.

D50 1.3.5.1 Warning Labels

Provide arc flash warning labels in accordance with UFC 3-560-01, *Electrical Safety, O & M*.

D50 1.3.5.2 Field-Required Nameplates

Provide laminated plastic nameplates for each switchboard, switchgear, panelboard, equipment enclosure, motor controller, relay, and switch. Each nameplate must identify the function and, when applicable, the position. Provide melamine plastic nameplates, 0.125 inch (3 mm) thick, white with black center core. Surface to be matte finish with square corners. Accurately align lettering and engrave into the core. Minimum size of nameplates is 1-inch by 2-1/2 inches (25 mm by 65 mm). Minimum size of lettering is 0.25 inch (6.35 mm) high normal block style.

D50 1.3.6 Factory Testing

The Government reserves the right to witness all factory testing. The manufacturer must have a calibration program that assures that all test instruments are maintained within rated accuracy.

D50 1.3.7 Electrical System Startup and Testing

Submit test plans for approval. Tailor test plans to the systems provided.

As part of the test plan, list make and model and provide functional description of the test instruments and accessories and describe the setup of the tests to be conducted. Test instruments must be capable of measuring and recording or displaying test data at a higher resolution and greater accuracy than specified for the equipment's performance.

D50 1.3.7.1 Factory Trained Engineer

Provide a factory trained engineer to supervise start-up and testing as required in referenced specifications.

D50 1.3.7.2 Performance Verification Testing

Perform in-service demonstration that all circuits and devices are in operating condition. Tests must confirm that each item of control equipment will function not less than five times. Provide all necessary test equipment, tools, fuel, load banks, labor, and materials for testing. As a minimum, test all systems in accordance with manufacturer's recommendations. Additional testing requirements for the various systems are described with those systems, hereinafter. Assure that all test instruments are

maintained within rated accuracy. Dated calibration labels are to be visible on all test equipment.

Submit a separate electrical field test plan in accordance with manufacturer's recommendations and that conforms to NETA ATS for each piece of Electrical Distribution Equipment and System requiring Performance Verification Testing.

The following items identify specific test requirements. Additional test requirements are contained in the applicable UFGS.

a. Panelboards - Field test each GFI and AFI circuit breaker with a UL 1436-certified outlet circuit tester to verify correct operation.
b. Motor control centers – Test motor control centers and motor starters in accordance with NETA ATS.
c. Surge Protective Devices (SPD) -

1) Inspect for physical damage and compare nameplate data with the drawings and specifications, if applicable. Verify from the nameplate data that the SPD equipment is appropriate for the system voltage.

2) Verify lead length between the SPD equipment and the circuit connection is less than one foot.

3) Verify wiring between the SPD equipment and the circuit connection does not include high-inductance coils or sharp bends.

4) Confirm circuit breaker used for SPD circuit connection is sized in accordance with SPD manufacturer's requirements.

5) Ensure SPD equipment is grounded in accordance with SPD manufacturer's requirements. Check the ground lead on each device for individual attachment to the ground bus or electrode.

6) Check tightness of connections in accordance with NETA ATS.

7) For SPD equipment with visual indications of proper operation, verify that it displays normal operating characteristics.

d. 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 must 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 must include originating and accepting messages at each station, at proper volume levels, without cross-talk or noise from other links or non-designated units. 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 must ensure that the system meets technical, operational, and performance specifications. Test plan is to include 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, furnish the UL Lightning Protection Inspection Certificate certified to NFPA 780 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.

n. Photovoltaic Energy System - Provide test plan that meets the requirements of IEC 62446. Test plan must include expected performance values. Compare system performance to expected performance and include at a minimum solar irradiance, DC energy, AC energy, ambient air temperature and PV cell temperature. Measure and report system performance for at least one full day. If the performance monitoring of the installed array indicates the array is not meeting its required performance predictions it must be corrected at the Contractor's expense. Following correction, performance monitoring must again be performed until the array meets required performance predictions. Measurements made under actual installation and temperature must be normalized to Standard Test Conditions (STC).

1) Verify that non-current carrying metal parts are grounded.

2) Verify that all components are labeled.

3) Verify mounting supports are installed properly and all fasteners are installed correctly and torqued to manufacturer's instructions.

4) Test open circuit voltage of each string in full sunlight.

5) Submit startup and testing report.

D50 1.3.7.3 Acceptance Tests and Inspections

The Government reserves the right to witness all Acceptance Tests and Inspections, review data, and request other such additional inspections and repeat tests as necessary to ensure that the system and provided services conform to the stated requirements.

The Qualified Testing Organization must provide the Acceptance Tests and Inspections test plan and perform the acceptance tests and inspections. Test methods, procedures, and test values must be performed and evaluated in accordance with NETA ATS, the manufacturer's recommendations, and paragraph entitled "Field Quality Control" of each applicable specification section. Tests identified as optional in NETA ATS are not required unless otherwise specified. Place equipment in service only after completion of required tests and evaluations of the test results have been completed. Contractor must supply to the testing organization complete sets of shop drawings, settings of adjustable devices, and other information necessary for an accurate test and inspection of the system prior to the performance of any final testing. Perform acceptance tests and inspections on Diesel-Electric Generators, Uninterruptible Power Supply (UPS) Systems, 400-Hertz Motor Generator Sets, 400-Hertz Solid State Frequency Converters, Automatic Transfer Switches, and Switchboards and Switchgear.

D50 1.4 DESIGN SUBMITTALS

Submit design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, and UFC 3-501-01, *Electrical Engineering*.

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

UFGS 26 08 00, *Apparatus Inspection and Testing*

UFGS 26 20 00, *Interior Distribution System*

UFGS 26 23 00, *Low-Voltage Switchgear*

UFGS 26 24 13, *Switchboards*

UFGS 26 29 23, *Adjustable Speed Drive (ASD) Systems Under 600 Volts*

UFGS 26 31 00, *Facility-Scale Solar Photovoltaic (PV) Systems*

UFGS 26 32 15.00, *Engine-Generator Set Stationary 15-2500 kW, with Auxiliaries*

UFGS 26 33 53, *Static Uninterruptible Power Supply (UPS)*

UFGS 26 35 43, 400-*Hertz (Hz) Solid State Frequency Converters*

UFGS 26 36 23, *Automatic Transfer Switches and By-pass/Isolation Switch*

UFGS 26 41 00, *Lightning Protection System*

UFGS 26 51 00, *Interior Lighting*

UFGS 27 10 00, *Building Telecommunications Cabling System*

UFGS 28 10 05, *Electronic Security Systems (ESS)*

D50 1.4.1 Sustainable Design Submittal

Submit sustainable design submittals in accordance with Part 2 Section 01 33 29, *Sustainability Requirements and Reporting*.

D50 1.5 CONSTRUCTION SUBMITTALS

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

Electrical Equipment, OMSI information for equipment, and Quality Assurance Submittals listed above.

Provide certification that all adjustable protective device settings have been set in accordance with the coordination study for the as-built equipment and configuration.

D50 1.5.1 Sustainable Construction Submittal

Submit sustainable construction submittals in accordance with Part 2 Section 01 33 29, *Sustainability Requirements and Reporting*.

D5010 ELECTRICAL SERVICE AND DISTRIBUTION

D501001 MAIN TRANSFORMERS

Provide pad mounted distribution transformers in accordance with PTS Section G40, *Site Electrical Utilities*.

D501002 SERVICE ENTRANCE EQUIPMENT

When a switchboard is required, the Designer of Record must utilize UFGS Section 26 24 13 for the project specification, and submit the edited specification section as a part of the design submittal for the project.

When low voltage switchgear is required, the Designer of Record must utilize UFGS Section 26 23 00 for the project specification, and submit the edited specification section as a part of the design submittal for the project.

When digital metering is required for connection to the Direct Digital Controls (DDC) system, the Designer of Record must utilize UFGS Section 26 24 13 to specify the digital metering requirements and submit the edited specification section as a part of the design submittal for the project.

D501003 INTERIOR DISTRIBUTION TRANSFORMERS

D501004 PANELBOARDS

Provide panelboards that comply with UL 67 and UL 50. UL 869A applies if used as service entrance equipment. Panelboards for non-linear loads must be UL listed, including heat rise tested, in accordance with UL 67, except with the neutral assembly installed and carrying 200 percent of the phase bus current during testing.

Provide molded case circuit breakers in accordance with UL 489. Ground fault circuit interrupting circuit breakers must comply with UL 943. Arc fault circuit breakers must comply with UL 489 and UL 1699.

D501005 ENCLOSED CIRCUIT BREAKERS

Provide molded case circuit breakers in accordance with UL 489. UL 869A applies if used as service entrance equipment. Provide with solid neutral when grounded conductor is present.

D501006 MOTOR CONTROL CENTERS

Provide motor control centers that comply with UL 845, NEMA ICS 2, and NEMA ICS 3. Motor controllers must comply with UL 508. Provide disconnecting means capable of being locked out for machines and other equipment to prevent unexpected startup or release of stored energy in accordance with 29 CFR 1910.147.

D501006 1.1 VARIABLE FREQUENCY DRIVES (VFD)

When Variable Frequency Drives are required, the Designer of Record must utilize UFGS Section 26 29 23 for the project specification, and submit the edited specification section as a part of the design submittal for the project.

D501090 OTHER SERVICE AND DISTRIBUTION

D501090 1.1 SURGE PROTECTIVE DEVICE (SPD)

D501090 1.2 BUSWAY

Provide busway that complies 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.

Provide switches that comply with NEMA WD-1 and UL 20.

D502002 LIGHTING EQUIPMENT

Install in accordance with manufacturer's recommendations and the additional requirements for "Severe Seismic Disturbance" contained in ASTM E 580. Fixture support wires must conform with ASTM A 641/A 641M, galvanized regular coating, soft temper.

D502002 1.1 BALLASTS

Electronic ballasts must include a 5-year warranty.

D5030 COMMUNICATIONS AND SECURITY

D503001 TELECOMMUNICATIONS SYSTEMS

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 SECURITY SYSTEMS (ESS)

When an ESS system is required, the Designer of Record must utilize UFGS Section 28 10 05, *Electronic Security Systems (ESS)*, for the project specification and submit the edited specification section as a part of the design submittal for the project.

D503005 1.2 PROTECTED DISTRIBUTION SYSTEMS (PDS)

Provide Protected Distribution Systems in accordance with UFC 3-580-10 and IA PUB-5239-22, Information Assurance Protected Distribution System (PDS) Guide Book.

D503005 1.3 SENSITIVE COMPARTMENTED INFORMATION FACILITIES (SCIF)

Electrical systems installed within SCIF spaces or facilities must comply with ICD 705, ICS 705-1, ICS 705-2, and with IC Tech Spec for ICD/ICS 705.

D503006 INDUSTRIAL CONTROL SYSTEMS (ICS)

D503090 OTHER COMMUNICATIONS AND ALARM SYSTEMS

D5090 OTHER ELECTRICAL SERVICES

D509001 GENERAL CONSTRUCTION ITEMS (ELECTRICAL)

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 must utilize UFGS Section 26 32 15.00 for the project specification, and 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 must utilize UFGS Section 26 36 23 for the project specification, and 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 must utilize UFGS Section 26 33 53 and submit the edited specification section as a part of the design submittal for the project.

D509003 GROUNDING SYSTEMS

D509004 LIGHTNING PROTECTION

When a lightning protection system is required the designer of record must utilize UFGS section 26 41 00 and submit the edited specification section as a part of the design submittal for the project.

D509005 ELECTRIC HEATING

D509006 ENERGY MANAGEMENT CONTROL SYSTEM

D509007 PHOTOVOLTAIC ENERGY SYSTEM

When a photovoltaic system is required, provide a grid tied photovoltaic energy system including roof mounted crystalline photovoltaic panels, combiner boxes, inverters, and support system. The Designer of Record must utilize UFGS Section 26 31 00 for the project specification, and submit

the edited specification section as a part of the design submittal for the project.

D509007 1.1 CODES AND STANDARDS

The PV system hardware and services must meet or exceed all applicable local, State and utility requirements, conform to the applicable codes and standards, and have passed the listing and qualification tests, listed below. (Comply with the most recent version of each document).

a. IEEE 1262 "Recommended Practice for Qualification of Photovoltaic Modules".
b. PowerMark certification for PV modules.
c. IEEE Standard 928-1986, Recommended Criteria for Terrestrial Photovoltaic Power Systems (PV system performance criteria).
d. IEEE 1547 Standard for Interconnecting Distributed Resources with Electric Power Systems.
e. Underwriters Laboratories 1741 (UL Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources).
f. Underwriters Laboratories 1703 (UL Standard for Listing Photovoltaic Modules).
g. Certification of PV Equipment: All PV modules, inverters, and electrical components must be listed or recognized by an appropriate and recognized United States Safety Laboratory (for example: UL or ETL).

D509007 1.2 PHOTOVOLTAIC ROOFTOP APPLICATION ANALYSIS

Provide a comprehensive "Photovoltaic Application Analysis" with a detailed description of system, application, site shading conditions and expected kW output of the rooftop photovoltaic applications. Utilize the Solmetric Suneye or the Solar Pathfinder shading analyzers to analyze the effects of the existing site shading conditions. Analysis must include estimated PV output in kWh per year. Coordinate rooftop application analysis with other equipment that is required to be placed on the roof to determine space available and proper solar orientation for photovoltaic equipment.

D509007 1.3 TECHNICAL REQUIREMENTS

The Contractor work responsibilities include at a minimum: system design, equipment selection, and PV system installations. System must be individually capable of providing peak power output of at least proposed PV system size, 208 or 480 volt, 3-phase, 4-wire power.

Configure system to allow automatic operation without operator intervention. Design system and specify equipment to minimize maintenance requirements. System must include metering incorporated with current AMI network (Advanced Metering Infrastructure) and planned energy metering projects.

Locate the inverter(s) disconnects and associated electrical equipment in an area that is accessible, weather-protected, and secure from vandalism and personal injury.

Mount disconnects and over current devices in approved boxes, enclosures, or panel boards. Disconnects and switches must be DC rated when used in DC applications. Bond metal enclosures and boxes to the grounding conductor.

At a minimum, electrical meters must capture the following data on individual system performance (minimum solar irradiance, DC power, AC real power, AC current, AC voltage, and power factor (recommend ION 8600 for AC); ambient air temperature, PV cell temperature, kW, and kWh). This data must be captured at hourly intervals for a minimum one year. Units of temperature, power, and current are to be in Fahrenheit, Watts, and Amps respectively.

Transformers, if required, must have a minimum efficiency based on factory test results of not less than the efficiency indicated in 10 CFR 431, Subpart K, paragraph 431.196(b). Transformers must be housed in NEMA 4X enclosures.

Layout of modules on roof must meet the requirements of NFPA-1 including labeling, roof access, and roof pathways. Coordinate roof venting requirements with fire protection engineer.

Mounting structures must be corrosion resistant to marine environment.

Provide permanent plaque or directory at each building service and power source identifying all other building services and power sources.

Refer to RFP Part 4, PTS B30 *Roofing* for additional layout and installation requirements.

D509007 1.4 OPERATORS MANUALS AND TRAINING

Operators manuals for each system component must include detailed instructions on how to operate the system, programming and installation instructions, emergency operating procedures, default program values and set points, listing of field programmed variables and set points, equipment wiring diagrams, product model number, with Name, Address and Telephone number of local representative, and starting, operating, and shut down procedures. Include normal and emergency shut down procedures, schedule of maintenance work, if any, recommended cleaning agents and methods, replacement parts list, including internal fuses, and warranty information.

Provide a formal 2-hour on-site training session instructing operators in the operation and maintenance of the new system, including operation and maintenance of inverters, disconnects and other system components. Instruct personnel in removal and installation of panels, including wiring and all connections. At the time of training furnish, for the equipment specified, operation and maintenance manuals, record drawings and recommended spare parts lists identifying components adequate for competitive supply procurement for operation and maintenance of system.

D509007 1.5 FIELD QUALITY CONTROL

Schedule connection of the photovoltaic system with the Contracting Officer such that the Contracting Officer can be present when the

photovoltaic system is tied to the grid.

Provide test plan that meets the requirements of IEC 62446. Test plan must include expected values for testing. Provide test results.

Tests must include the following:

a. Verify that non-current carrying metal parts are grounded.
b. Verify that all components are labeled.
c. Verify mounting supports are installed properly, and all fasteners are installed correctly and torqued to manufacturer's instructions.
d. Test open circuit voltage of each string in full sunlight.
e. Test output of inverter. Measure solar irradiance. Perform calculations to show inverter output is consistent with the expected performance.

D509090 OTHER SPECIAL SYSTEMS AND DEVICES

D509090 1.1 400 HERTZ SYSTEMS

The Designer of Record must utilize UFGS Section 26 35 43 for the project specification, and submit the edited specification section as a part of the design submittal for the project.

--End Of Section--

SECTION E10

EQUIPMENT
09/22

E10 GENERAL

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

E10 1.1 GENERAL REQUIREMENTS

Where required by the project program, obtain the services of equipment specialists to specify any audiovisual, shop, fitness equipment, or other specialty equipment. Equipment specialists must not have any affiliation with the product specified. All specialty equipment must be installed by qualified installers regularly engaged in installing the specialty equipment. Systems furnishings installers must be the systems furniture manufacturer's dealer of record.

E10 1.2 DESIGN GUIDANCE

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

Industry standards, codes, and Government standards that are referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Federal Facility Criteria (FFC) at the Whole Building Design Guide (WBDG) website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award.

E10 1.2.1 Industry Standards and Codes

Loading Dock Equipment Manufacturers' Association (LODEM)

E10 1.2.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed

	therein, which includes the following significant UFC(s): UFC 3-101-01, Architecture UFC 3-120-10, Interior Design)
UFC 1-200-02	High Performance and Sustainable Building Requirements

E10 1.3 PERFORMANCE VERIFICATION AND COMPLIANCE TESTING

Provide verification of satisfactory special equipment and furnishing systems performance via Performance Verification Testing, as detailed in this section of the RFP.

E10 1.3.1 Field Tests for Dock Leveling Equipment

a. Roll-over Tests - Move roll-over load of 20,000 pounds (9,072 kg) over the dock leveler between the bed of a freight carrier and the building loading dock surface for ten cycles. With the ramp extension retracted and the ramp platform leveled with the building loading dock surface, run a 20,000 pound (9,072 kg) roll-over load over the ramp in various directions for 20 cycles. No permanent deformation or hydraulic fluid leakage must occur subsequent to examination after these tests.
b. Drop Tests - Twice, drop test the dock leveler at the indicated rated capacity as follows: With the load on the platform and the load resting on a vehicle carrier bed not less than 10 inches (254 mm) above loading dock surface, pull the carrier or pull away from the lip, leaving the loading ramp unsupported. The measured vertical drop of the dock leveler taken at the point where the lip rests on the vehicle carrier must not exceed 4 inches (102 mm) during each of the drop tests. Inspect the loading ramp after each drop and ensure no damage or distortion to the mechanical, electrical, or structural components. There must be no leakage from the hydraulic system.
c. Acceptance Tests - Perform an acceptance test in the presence of the dock leveler manufacturer and the Contracting Officer subsequent to the roll-over load and drop tests. Conduct operation of the equipment through all of its motions and specified checks as follows: (a) extend lip to rest on a variety of freight carriers with beds up to 12 inches (305 mm) above and below deck level; (b) test 102 mm (4 inches) drop limitation with 7,000 pound (3,175 kg) load on ramp, evenly distributed; (c)test level compensation with the ramp, loaded with a minimum of 7,000 pounds (3,175 kg); and (d) test proper compensation (float) for various compression of counter-springs, with ramp loaded and unloaded.

E10 1.4 DESIGN SUBMITTALS

Provide design submittals in accordance with Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N,

Navy and Marine Corps Design Procedures, UFC 3-101-01, *Architecture*, and UFC 3-120-10, *Interior Design*.

E10 1.5 CONSTRUCTION SUBMITTALS

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

Field tests of equipment, vault door, loading dock equipment, kitchen equipment and unit kitchens.

Energy efficiency ratings for food service equipment, as applicable.

E1010 COMMERCIAL EQUIPMENT

E101005 SECURITY & VAULT EQUIPMENT

E101005 1.1 VAULT AND DOORS

Design the Vault ("Weapons Storage Area" (WSA) or "Armory", or other title according to the project program) space in accordance with criteria in Military Handbook (MIL-HDBK) 1013/1A to provide at least 10 minutes of delay time against low and medium threat severity levels of forced entry. The space is required to be built to the construction standards described in MIL-HDBK-1013/1A for Class A vaults. The reinforced concrete must have minimum 28-day compressive strength of at least 3000 PSI (20,684 kPa) and the floor, walls, and ceiling/roof components of this space must all be cast in place and at least 8 inches (200 mm) thick. The door into the vault must be a General Services Administration (GSA)-Approved and labeled Class 5 Security Vault Door that conforms to Federal Specification AA-D-00600. Provide door manufacturer’s modified standard or custom Day Gate, designed for use with the vault door furnished, for access control and weapons issue. Except for the door opening, penetrations and openings through the structural “security” envelope of the floor, walls, and ceiling/roof of the Vault that are 96 sq. inches (618 sq. cm) or greater with the least dimension greater than 6 inches (150 mm) are not allowed. PTS Section D50, *Electrical*, includes requirements for Intrusion Detection System (IDS) within the space and for Security Lighting at the outside of the Vault Door to the space.

E101005 1.1.1 Set-backs

Where the perimeter walls of the WSA spaces are part of the facility exterior walls, the vault walls must be set back from the exterior part of the exterior wall to allow at least 4 inches (100 mm) for the normal wall facing to cover the vault walls.

E101005 1.1.2 Egress

Where a WSA space exceeds 1000 square feet (90 sq m) in floor area, or will have more than eight occupants, the space must have a minimum of 2 exits for safety purposes. When more than one entrance / exit is required, each must be equipped with a

Security Vault Door, with only one used for normal entry access.

E101005 1.2 SECURITY VAULT DOOR

Security Vault Door must be GSA-Approved and labeled Class 5 Security Vault Door that conforms to Federal Specification AA-D-00600. Provide GSA-Approved and labeled Class 5 Security Vault Door that conforms to Federal Specification AA-D-00600. Door(s) for normal or special entry access must be Class 5, either Type IIR- right opening swing without optical device or Type IIL- left opening swing without optical device as determined by design arrangement, Style K- Key change combination lock, Design S- single lock.

Where a second or additional door is required for safety purposes, door(s) for exit only must be Class 5, either Type IR- right opening swing with optical device or Type IL- left opening swing with optical device as determined by design arrangement, Style K- Key change combination lock, Design B- no exterior hardware.

E101005 1.3 DAY GATE

Provide vault door manufacturer's modified standard or custom day gate designed for use with vault door furnished, for access control and weapons issue. Day gate construction must be minimum 10 gage (3.4 mm) steel flattened and expanded metal welded to a 1 inch (25 mm) minimum steel channel or angle welded frame; expanded metal pattern must be 1 inch by 1-3/4 inch (25 by 45 mm) diamond grid. Maximum clearance between sides, top and bottom of the day gate and the vault door-frame and floor must be 1 inch (25 mm) when the day gate is closed. Provide gate hinged on same side as the vault door, swinging to 180 degrees into the vault from closed to open positions. Provide day gate with locking device operable from both sides; the outside by key and the inside by key, knob, lever, or deadbolt; the inside locking device must either be positioned so that it is not accessible from the outside or it must be operable by key only. Day gate must include an issue port opening, cover with locking mechanism, and shelf. The issue port must be a framed opening welded to the day gate frame with a hinged door cover. The hinged door must be minimum 18 gage (1.2 mm) steel and must be lockable from the inside only. The opening must be 8 inches (200 mm) high and 12 inches (300 mm) wide; tolerances are plus or minus 0.125 inch (3.2 mm). When the issue port is closed, the hinged door cover must match the opening to within 0.0625 inch (1.6 mm). The shelf must be minimum 16 gage (1.5 mm) stainless steel, 12 inches (300 mm) deep by 12 inches (300 mm) wide to match the port opening, and must be capable of withstanding a vertical force of 100 lbf (445 N) at any point without deformation. Provide the manufacturer’s standard painted finish to match that of the vault door. The day gate must not interfere with the operation of vault door inner escape device.

E1020 INSTITUTIONAL EQUIPMENT

Institutional equipment includes items that are normally found in hospitals, laboratories, auditoriums, and libraries.

E102001 MISCELLANEOUS COMMON FIXED & MOVABLE EQUIPMENT

This section must include fixed workbenches, hazardous and non-hazardous shop materials cabinetry, shop tools, and other fixed and movable equipment.

E102009 AUDIO-VISUAL EQUIPMENT

E102009 1.1 CEILING MOUNT FOR PROJECTOR

Provide the ceiling mounted hardware for a digital projector, to be coordinated with support blocking (see PTS Section C10, *Interior Construction*) and electrical and data connections (see Section D50, *Electrical*).

E1030 VEHICULAR EQUIPMENT

E103002 LOADING DOCK EQUIPMENT

This paragraph covers the requirements for dock bumpers, truck-trailer restraining devices, and industrial, mechanical and electro-hydraulic dock levelers of a fixed hinged type. All loading dock equipment must be Navy certified.

Provide a Loading Dock Equipment System for the protection of service docks and for the loading and unloading of service vehicles.

E103002 1.1 DOCK LEVELERS

Based on the performance requirements of the project program, provide American National Standards Institute (ANSI) MH30.2 (see LOEDM) steel tread plate lip and platform, hinged and supported from beneath by steel framework that contains lifting, positioning, and lowering assembly. The design must permit washing with water and detergents, and operation in an ambient temperature from 0 degrees F to plus 110 degrees F (-18 degrees C to plus 43 degrees C). Minimum roll over capacity must not be less than 20,000 pounds (9,072 kg).

E103002 1.1.1 Height Adjustment

Provide a ramp with a minimum incline adjustment of 24 inches (600 mm). Divide 12 inches (300 mm) above and 12 inches (300 mm) below the platform height.

E103002 1.1.2 Loading Ramp Compensation

a. Freight Carrier Out of Level - Allow a minimum correction of one inch for each 18 inches (450 mm) and maximum of 4-inch (100 mm) correction of ramp width over the width of the ramp.
b. Loading and Unloading of the Freight Carrier - When the lip is extended, provide a 4-inch (100 mm) compensation for carrier spring deflection to allow full contact between the lip and the carrier bed.

E103002 1.1.3 Safety Devices

a. Electro-hydraulic System - Provide a device to automatically prevent a drop of more than 4 inches (100 mm)

of the lip should the freight carrier move away from the dock leaving the lip unsupported.

b. Mechanical System - Provide a three-position safety system to limit platform fall to dock level and 4 and 8 inches (100 and 200 mm) below dock level.

c. Dock Bumpers - Provide laminated rubber, tire fabric or equivalent dock bumpers along the length of the loading dock.

E103002 1.1.4 Operation

a. Mechanical Control - Mechanical chain activated, with extension-spring operation and counter-balance non-manual, raising and lowering system.

b. Electro-Hydraulic Control - Provide dock leveler with pushbutton control, heavy-duty dust tight and oil tight rated in accordance with National Electrical Manufacturers Association (NEMA) ICS 2, Part ICS2-216 for alternating current.

c. Construction and Materials - The entire live load carrying surface of the ramp and rear attachment must not be less than 1/4-inch(6 mm) thick, 55,000 PSI (379,200 kPa) minimum yield strength, low alloy, non-skid steel tread plate.

d. Toe Guards - Provide sides or edges of the ramps which rise above the surrounding loading dock with sheet carbon steel skirts or toe guards of minimum 14 gage nominal thickness.

E103002 1.1.5 Electro-Hydraulic Lift System

Provide a complete and separate system for each dock leveler. Design system to withstand not less than 150 percent of the design operating pressure. Provide hose, fittings, pipe and tubing with working pressures based upon a minimum 4 to 1 safety factor of bursting pressure.

E103002 1.1.6 Electrical Requirements

National Fire Protection Association (NFPA) 70, NEMA ICS 2, NEMA ICS 6 and NEMA MG 1

a. Motor - Conform to NEMA MG 1 and continuous duty or 60-minute time rated, industrial type, single speed rated for operating conditions.

b. Control - NEMA ICS 2, size 0 controller for heavy industrial service.

c. Transformer - Totally enclosed, self-cooled, dry type transformer. Incorporate circuit breakers with ground fault interrupting protection conforming to Underwriters Laboratories (UL) 943.

E103002 1.1.7 Structural Warranty

Present a manufacturer's warranty certifying the leveler against operational malfunction or structural failure, or both, for a period of 10 years from the date of acceptance by the Government. Warranty may exclude failure through overloading evidenced by

member breakage or residual deformation; but it must not exclude breakage of welds or fastenings, fatigue breakage of components, or wear of moving parts. Provide warranty to cover the full costs of repairs, or replacements in case of a nonrepairable failure.

E103002 1.1.8 Accessories

a. Dock Truck or Trailer Restraining Device - Provide self-aligning device, with a positive restraining force of not less than 18,000 pounds (8,165 kilograms). Device must service all truck or trailers with Interstate Commerce Commission (ICC) bars located between 12 and 30 inches (300 and 750 mm) above ground level.

E103003 WAREHOUSE EQUIPMENT

This paragraph covers the requirements for storage racks, heavy duty shelving, material handling conveyors, and other warehouse equipment. See the project program.

E103004 AUTOMOTIVE SHOP EQUIPMENT

This paragraph covers the requirements for automotive vehicle lifts meeting the requirements of ANSI/ALI ALCTV-1998 standards, and other automotive shop equipment such as pneumatic liquids delivery systems. See the project program.

E1040 GOVERNMENT FURNISHED EQUIPMENT

Refer to the project program.

E1090 OTHER EQUIPMENT

E109002 FOOD SERVICE EQUIPMENT

Provide Food Service Equipment and the kitchen design in accordance with FC 4-722-01N, *Navy and Marine Corps Dining Facilities*. This paragraph covers the items of commercial food service equipment. Included are items used for liquid and solid food storage, food preparation, cooking, display, serving, and clean up equipment. Provide 180 degree F (82 degree C) hot water or chemical treatment for sinks, dishwashers, pot washers, and exhaust ventilator wash down systems.

Provide products that meet or exceed the specified energy efficiency requirements of FEMP designated or Energy Star qualified products. Submit documentation certifying that products conform to Public Law 109-58 by meeting or exceeding Energy Star or FEMP efficiency requirements as defined at "Energy-Efficient Products" at http://femp.energy.gov/procurement. Indicate the Energy Efficiency Rating.

E109002 1.1 COMMERCIAL FOOD SERVICE EQUIPMENT

E109002 1.1.1 Equipment Materials

Fabricate custom and commercial equipment in accordance with NSP 2.

a. Stainless Steel Sheets - American Society for Testing and Materials (ASTM) A167, 18-8 Composition, Type 302 or 304 or 316, non-magnetic, with a No. 4 finish on the exposed face.
b. Tubing - ASTM A 270
c. Framing and Cross Bracing - ASTM A 276, Type 302 or Type 304 or Type 316
d. Copper Tubing -

1) Tube - ASTM B 88, Type K, annealed, for buried or embedment in concrete, and Type L, hard drawn, for above grade installation.

2) Fittings - ANSI B16.18, above grade, American Society of Mechanical Engineers (ASME) B16.22 or ASME B16.26, above or below grade.

e. Welded Joints - Use tungsten inert gas process. Use filler metal compatible with the material being welded. Make all visible welds ductile and of same color as adjoining surfaces. Coat welds in hidden areas that are not finished by grinding and polishing and the accompanying discoloration in the factory with a metallic-based paint to prevent progressive corrosion. Grind exposed welded joints flush with the adjoining material and finish and polish to match the adjoining surface. Grind off excess metal and smooth to a No. 4 finish. Remove imperfections such as pits, runs, sputter, cracks, low spots, voids and buckle.

Penetrate entire thickness for the entire length of the joint; make joints flat, continuous and homogeneous with the sheet metal without reliance on straps under seams or spot welding. When stainless steel is joined to dissimilar metals, use stainless steel for fastening devices and welding material.

f. Solder - ASTM B 32, 95.5 tin-antimony solder or other lead-free solder for contact with potable water or food. Provide ASTM B 32, alloy grade 50B for temperatures up to 150 degrees Fahrenheit (65 degrees Celsius).

E109002 1.1.2 Custom-Fabricated Counters, Dishwasher Counters, and Sinks

Fabricate of 14 gage (1.8 mm) stainless steel, with all shop seams and water tight welded corners ground smooth, and polished. Pitch all flat surfaces to drain and eliminate any chance of standing water. Counters and sinks must be furnished complete with integral stainless steel backsplashes, side splashes, and legs with adjustable feet.

a. Sinks - Provide integral sinks in accordance with the requirements of NSF 2, and ASTM A112.19.3M. Provide minimum of 0.75 inch (19 mm) radius on all corners.

E109002 1.1.3 Exhaust Ventilators

Exhaust ventilators must conform to NFPA 96, UL 710, and SMACNA DCS. Fabricate exhaust ventilators of minimum 18 gage stainless steel in segments not longer than 12'-0". Provide centrifugal

grease-extracting design to remove 95% of matter from the air with non-removable extracting baffles located in the plenum chamber. Exhaust ventilators must provide integral make-up air system in accordance with NFPA 96. Provide automatic wash-down cycle and fan control on adjacent wall.

a. Fire Damper - Provide mechanically driven damper and damper control. Activate by heat-sensing thermostat set to react to a temperature of 350 degrees F (177 degrees C) in exhaust duct at exhaust ventilators.
b. Fire Protection System - Provide a pre-engineered wet system in accord with NFPA 96.

E109002 1.1.4 Pre-Fabricated Walk-in Refrigerators and Freezers

Provide walk-in units manufactured for food service use conforming to NSF 7, UL 207, and UL 471. Provide refrigeration unit complying with American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) 15. Outside compressors, if used, require winter controls, housing, and crankcase heater. Provide monitoring system to alarm abnormally low or high temperatures, and personnel safety alarm. If the unit utilizes the floor of the facility as an interior surface of the unit, it must be insulated and separated from adjacent floors.

E109002 1.1.5 Food Waste Disposer - ASTM F917

E109002 1.1.6 Beverage Dispenser, Non-Carbonated, Refrigerated - ASTM F918

E109002 1.1.7 Food Slicing Machine - ASTM F919

E109002 1.1.8 Food Mixing Machine - ASTM F952

E109002 1.1.9 Powdered Iced Tea Dispenser - ASTM F1023

E109002 1.1.10 Frying and Braising Pan, Tilting - ASTM F1047

E109002 1.1.11 Food Cutter - ASTM F1126

E109002 1.1.12 Food Waste Pulper - ASTM F1150

E109002 1.1.13 Cooker, Steam - ASTM F1217

E109002 1.1.14 Ovens, Microwave - ASTM F1360

E109002 1.1.15 Vegetable Peeling Machine - ASTM F1371-04

E109002 1.1.16 Combination Oven - ASTM F1495

E109002 1.1.17 Food Processor - ASTM F1568

E109002 1.1.18 Kettle, Steam Jacketed (20-200 gal) Floor or Wall Mounted - ASTM F1602

E109002 1.1.19 Kettle, Steam Jacketed (32 oz-20 gal), Table Mounted

- ASTM F1603

E109002 1.1.20 Freezer, Ice Cream, Soft Serve - ASTM F1604

E109002 1.1.21 Griddle, Single or Double Sided - ASTM F1919

E109002 1.1.22 Deep Fat Fryers - ASTM F1963

E109002 1.1.23 Dough Divider/Rounder - ASTM F1966

E109002 1.1.24 Dishwashing Machines

a. Hot Water Sanitizing Rack Type, ASTM F857
b. Hot Water Sanitizing Single Tank, ASTM F858
c. Hot Water Sanitizing, Multi-Tank, ASTM F859
d. Hot Water Sanitizing, Multi-Tank, Conveyor, ASTM F860
e. Chemical Sanitizing, Stationary Rack, ASTM F953
f. Chemical Sanitizing, Fresh Water Rinse, ASTM F1022
g. Hot Water Sanitizing, Oval Conveyor, Multi-tank, ASTM F1237

E109002 1.1.25 Pot and Pan Washing Machines

a. Heat Sanitizing, Oscillating Arm Type, ASTM F1202
b. Heat Sanitizing, Rotary Conveyor, ASTM 1203
c. Heat Sanitizing, Rack Type, Rotary Spray, ASTM F1114

E109002 1.2 RESIDENTIAL OR LIGHT COMMERCIAL ELECTRIC KITCHEN EQUIPMENT

E109002 1.2.1 Cooking Top

Conform to UL 197 and UL 858.

E109002 1.2.2 Freezer

UL 250, minimum 14 cubic feet (0.39 cubic meters), frost-free.

E109002 1.2.3 Refrigerator

UL 250, refrigerator with frost-proof freezer, minimum 14.6 cubic feet (0.41 cubic meters).

E109002 1.2.4 Freestanding Ice Maker

UL listed and NSF approved; self-contained, air-cooled model, minimum ice production of 355 pounds (161 kg) per 24 hours, and a minimum bin storage capacity of 180 pounds (82 kg) of ice cubes.

E109002 1.2.5 Griddle

UL 197 and NSF 2, built-in counter-top model. Minimum capacity must be 260 pancakes or 420 hamburgers 4 ounces (110 g) per hour.

E109002 1.2.6 Microwave Oven

UL 923, minimum 1 cubic foot (0.03 cubic meter) capacity.

E109002 1.2.7 Oven

UL 858, self-cleaning and built-in.

E109002 1.2.8 Trash Compactor

UL 1086, under-counter model with storage compartment and 20 gallon (75 liter) trash disposal bag capacity.

E109002 1.2.9 Kitchen Exhaust Hood

NFPA 96 and NSF 2, factory fabricated of minimum 18 gage stainless steel.

E109002 1.2.10 Range Hood

UL 858, vented or non-vented with two-speed fan.

E109002 1.2.11 Dishwasher

UL 921 or UL 749 with detergent dispenser. For heavy-duty dishwasher, provide stainless steel commercial grade with approximately 300-dish per hour and 540 glasses per hour ratings.

E109002 1.2.12 Residential Garbage Disposal

UL 430, stainless steel, continuous feed with minimum 1/2 or 3/4 hp motor. Optional 1 hp motor for heavy usage.

E109005 UNIT KITCHENS

E109005 1.1 UNIT KITCHENS

Provide complete unit kitchens with countertops, sinks, faucets, appliances, and accessories. Comply with DoD Architectural Barriers Act (ABA) Standards in units for the disabled. Provide high pressure laminate or natural wood finish.

E109005 1.2 UNIT KITCHEN COMPONENTS

a. Cabinets - American National Standards Institute/Kitchen Cabinet Manufacturers Association (ANSI/KCMA) A161.1 wood and plywood cabinetry with drainers and cabinet doors.

1) Provide 3/4-inch (19 mm) solid wood for face framing, drawer fronts, and shelves up to 36 inch (91.44 cm) wide. Cabinet body members require spline, biscuit, dowel or dado joining.

2) Provide 1/2-inch (12.8 mm) solid wood for drawer boxes with dovetail or dowelled joints.

3) Provide 3/8-inch (9 mm) plywood for cabinet box and toe board.

4) Provide cabinet doors of High Pressure Laminate covered medium density fiberboard or stile and rail doors.

b. Countertop - Provide ASTM 2124.3 and ASTM 2124.6, solid polymer countertop and 3-1/2 inch (89 mm) backsplash.
c. Sink and Faucet - Provide ANSI A112.18.1M, NSF International Standard 61 sink and faucet. Section 9 for sink and faucet. Provide large 22 gauge stainless steel sink with basket strainer in w with water stopper. Faucet must be a washerless cartridge system.
d. Refrigerator-Freezer – 5 cubic foot minimum undercounter refrigerator freezer. Provide interior light, defrost, adjustable shelving, adjustable thermostat features, and zero degree freezer.
e. Microwave Oven/Ventilation Hood Combination. Provide 1.4 cubic foot 900 watt minimum, microwave/hood above cooktop. Ductless hood must be convertible to ducted at the project site.
f. Cooktop – Provide drop-in 2 burner black ceramic cooktop with 1200 watt elements.
g. Dishwasher – Provide 24 inch wide Energy Star Large capacity dishwasher.
h. Accessories.

1) Back wall shield and end wall shields when against an end wall.

2) Countertop fluorescent lighting.

3) Drawer slides rated for 100 pound capacity.

4) Door hinges to be adjustable, self-closing, and configured to allow screw application to cabinet door from two directions.

E109090 OTHER SPECIALIZED FIXED AND MOVABLE EQUIPMENT

Specialized fixed and moveable equipment not described by the other assembly categories.

E109090 1.1 WEAPONS RACKS

Weapons Storage Racks may be purchased or may be steel fabrications. Comply with OPNAVINST 5530.13c and standard operating procedure for the facility.

E109090 1.2 GEAR DRYING CAGES

Drying cages (racks) for SCUBA gear may be purchased or may be fabrications. Comply with standard operating procedures for the facility.

-- End of Section --

SECTION E20

FURNISHINGS
09/22

E20 GENERAL

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

E20 1.1 DESIGN GUIDANCE

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

Industry standards, codes, and Government standards referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Federal Facility Criteria (FFC) at the Whole Building Design Guide (WBDG) website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award:

E20 1.1.1 Industry Standards and Codes

E20 1.1.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s): UFC 3-101-01, Architecture UFC 3-120-10, Interior Design)
UFC 1-200-02	High Performance and Sustainable Building Requirements

E20 1.2 GENERAL REQUIREMENTS

Provide the services of an Interior Designer, certified by the National

Council for Interior Design Qualification (NCIDQ), or a state and/or jurisdiction Certified, Registered, or Licensed Interior Designer prepare both the Furniture, Fixtures, & Equipment (FF&E) and the Structural Interior Design (SID) Package, attend and participate, in entirety, all kick-off meetings, design meetings, to include, but not limited to, design charettes, concept design workshops, and review meetings to develop the building design, floor plan, and the FF&E package. Provide the services of equipment specialists to specify the audiovisual, shop, or specialty equipment. The Interior Designer and any specialists must not be affiliated with any furniture dealership/vendor or manufacturer. The Government Interior Designer reserves the right to approve/disapprove the qualifications of the Contractor's Interior Designer.

Systems furnishings installers must be the systems furniture manufacturer's approved dealer of record. In addition, installation dealers must be located within a 100 mile radius of the project site unless approved by the government Interior Designer.

[Re-purpose/ recycle existing furniture if not relocated by the government. Provide verification that the existing furniture was not disposed of at the landfill.]

E20 1.3 DESIGN SUBMITTALS

Provide design submittals in accordance with Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine Corps Design Procedures*, and UFC 3-120-10, *Interior Design*.

E20 1.4 CONSTRUCTION SUBMITTALS

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

Art work and FF&E Package

E2010 FIXED FURNISHINGS

E201001 FIXED ARTWORK

E201002 WINDOW TREATMENTS

Provide interior window coverings, associated hardware and controls at each exterior window and at any interior view window where privacy may be required. Refer to the Project Program for size, pattern and style of window treatments. At a minimum, functional window coverings such as blinds or solar shades are required on all projects.

E201002 1.1 BLINDS

Venetian blinds must be one-inch horizontal room-darkening commercial grade aluminum at a minimum thickness of 0.2mm (.008") (after coating)

with a minimum of 45.72 slats per meter (15 slats per foot). Provide blinds at each exterior window and at any interior window where privacy may be required. Provide and install one full size sample for review and approval.

E201002 1.2 SHADES

Provide energy efficient solar shading systems for exterior windows. The system must maintain visibility while reducing glare, solar heat gain during the summer and heat loss during the winter. Openness configuration must be no more than 5% for most areas. The system fabrics and components must be dimensionally stable and must be manufactured to withstand fading, fire, mildew, and soiling.

E201002 1.3 DRAPERIES AND HARDWARE

Draperies must be manufactured under General Services Administration (GSA) contract as part of FF&E. Drapery can be accordion-fold, ripple-fold, or pinch-pleat with associated hardware suitable for the project requirements. All draperies must meet the National Fire Protection Association (NFPA) Code 701 California Fire Marshall's flame retardant requirements.

E201003 SEATING (FIXED)

E201003 1.1 AUDITORIUM, LECTURE AND CLASSROOM SEATING

The system must permit the standards to be installed on radial lines from a common center for which concentric circles are determined with each row of units utilizing common middle standards. Standards in each row must be placed laterally so the aisle-end standards will be in alignment as indicated on seating layout drawing. The angle of inclination of backs must be adjusted for variations in sightlines. Mechanical attachment of components must be of sufficient flexibility so that when permanently assembled they will compensate for the changing dimensions laterally between standards caused by convergence toward the center. Seat and back attachments must absorb inaccuracies in lateral spacing of standards at point of attachment caused by unevenness of floor. Varying lateral dimensions of backs and seats must be in accordance with approved seating layout. Minimum width of seating unit must be 20 inches and may be used only to complete a specific row dimension.

E201003 1.2 FIXED TABLES FOR AUDITORIUM, LECTURE AND CLASSROOMS

Provide worksurfaces mounted to tubular steel, sheet steel, or cast iron floor standards. The standards must be formed to fit the floor incline so that the standards will be vertical. The feet must be formed to eliminate tripping hazards and have holes for bolt attachment to the floor. Provide riser standards, cantilevered standards and aisle and end standards as required. Provide communications, data and power routing as required. Provide a high-pressure plastic laminate over medium density particleboard for the worksurfaces with coordinating vinyl or resin edge detail.

E2020 MOVABLE FURNISHINGS

Furnishings, Fixtures, and Equipment (FF&E) must include furniture, shop equipment, audiovisual equipment, and specialty equipment. Weapon racks, drying cages, and lockers are not considered FF&E. FF&E must be fully integrated with the building systems and finishes. FF&E may also include specialty items for which the customer activity must be responsible for specifying.

Design and provide as required FF&E for all areas as developed during client programming. Design an FF&E package and prepare supporting plans and procurement data in accordance with the general interior design requirements in UFC 3-120-10.

E2020 1.1 FF&E PACKAGE

FF&E Package: Design and provide a fully usable and complete facility to include a FF&E movable furnishings package from Government supply sources according to Federal Acquisition Regulations. The FF&E will include, but not limited to, systems and modular furniture, training and conference furniture, seating, tables, artwork, decorative window covering, specialty furniture and equipment, dormitory room furnishings, and accessories. Naval Supply Systems Command (NAVSUP) Blanket Purchase Agreements (BPA) must be used whenever possible. The government will provide separate funding for the FF&E package. Construction funds will not be used. The FF&E Package must include shipping, freight, handling, installation and the Handling and Administration Rate (HAR) percentage as applied to the final FF&E total cost.

E2020 1.1.1 Authorization

The government will provide separate funding for procurement of the FF&E package. Upon receipt of required funding, the Contractor must be authorized by the Contracting Officer as a planned line item modification to the contract/task order to procure all FF&E using predominately negotiated Federal contracts. The amount of the modification will be the actual cost of these items from the Federal price schedules or NAVSUP BPAs, including any freight and installation charges from the furniture supplier as well as the Contractor's FF&E Handling and Administration Rate (HAR). The HAR includes all of the prime Contractor's effort related to storage, coordination, handling, administration of subcontractors, and all other associated costs and profit for the procurement of FF&E. The prime Contractor will propose in the contract/task order solicitation the FF&E HAR. The Contractor's proposed HAR may not exceed 5% of the total FF&E costs, as noted on the bid schedule. No other charges, expenses, fees, or markups will be authorized.

The government Interior Designer will approve the final FF&E submittal. The FF&E package will be presented to the Contracting Officer and the Contractor must provide the FF&E exactly as specified and approved.

The Contractor will receive a letter of authorization from the Contracting Officer citing the name of the furniture dealer and

other information to use when accessing the government supply sources.

E2020 1.2 PURCHASE AND INSTALLATION

Coordinate the building completion date with the installation dealer specified in the FF&E Package. The Contractor or Contractor's representative is responsible for the following: issuing purchase orders, receiving acknowledgements, sending copies of purchase orders to the installation dealer(s) specified in the FF&E package, and providing necessary deposits to furniture manufacturers.

The FF&E installation dealer(s) is responsible for the following: Receiving and installing all FF&E specified in the FF&E package, coordinating delivery and installation with the Contractor, inspecting for damage, providing delivery receipts to the Contractor, filing necessary freight claims, hanging artwork, bulletin boards, etc., removing packaging material, cleaning up the site upon completion, and adhering to Contractor's safety requirements.

E2020 1.2.1 Use of GSA Schedules and Blanket Purchase Agreements (BPAs)

The prime Contractor or FF&E dealer will be authorized to purchase supplies or services from the Navy Furniture BPAs for FF&E requirements, under the terms of the contract. The Contractor will receive a letter of authorization from the Contracting Officer citing the name of the furniture dealer and other information to use when accessing the government supply sources or BPAs.

E2020 1.2.2 Deposits

The Contractor must anticipate providing a deposit of between 30% to 50% of the furniture costs when placing their order.

Manufacturer price increases must be anticipated. Recommend ordering FF&E product once funds are received to avoid incurring additional costs. Delayed production and delivery dates can be noted at the time of order placement to coincide with building completion dates. Any costs incurred due to manufacturer price increases will be the burden of the Contractor.

E2020 1.2.3 Davis Bacon Wages

Davis Bacon wages do not apply to the FF&E installer from the government supply sources. The workforce for the FF&E installation and delivery must be separate and distinct from the labor workforce performing under the construction contract.

E2020 1.2.4 Sales Tax

Exemptions for certain State or Local taxes may be available to the Contractor and/or its subcontractors. The Contractor must take maximum advantage of all exemptions, including obtaining a resale permit, from State and Local taxation authorities whether

available to it directly or available to the Contractor based on an exemption afforded the government. The responsibility for paying applicable taxes rests with the contractor. State and local taxes applicable to the FF&E line will be included with the subcontractor's quote, if applicable.

E2020 1.2.5 Bonds

FF&E line item is not considered construction and the prime Contractor will not be required to secure any additional bond for the award of the FF&E line item unless otherwise indicated in the RFP. If any additional bond is required for the FF&E line item it is to be included in the prime Contractor's FF&E HAR.

E2020 1.2.6 Unique Item Identification (IUID) and Validation

Unique item identification and valuation is a system of marking and valuing items delivered to DoD that enhances logistics, contracting, and financial business transactions. The IUID policy is mandatory for all DoD contracts that require the delivery of items. An item is a single article or a single unit formed by a grouping of subassemblies, components or constituent parts. Provide DoD Unique item identification, valuation and delivery of data for all required FF&E items for which the government's unit acquisition cost is $5,000 or more.

E2020 1.2.7 Buy American Act and Trade Agreement Act

All supplies under the FF&E line item are subject to the Buy American Act and Trade Agreement Act (TAA). The GSA contracts and NAVSUP Blanket Purchase Agreements are required to comply with the Buy American Act and TAA.

E2020 1.2.8 Small Business Requirements

The FF&E is subject to the Contractor's Small Business Goals however the government requires the furniture be purchased from NAVSUP Blanket Purchase Agreements (BPA). Most manufacturers on the Office Furniture BPA are large business and most manufacturers on the Dorm and Quarters BPA are small business. Installation dealers are small business. Under the terms of the BPA, the FF&E must be ordered directly through the GSA manufacturer. Using pass-through companies to achieve Small Business Goals will not provide the Contractor credit unless they manufacturer 20% or provide 50% of the service purchased. The government will not incur additional costs to use small business.

E2020 1.2.9 Installation

The FF&E package includes the installation of all furniture and furnishings as specified in the FF&E package. The installation dealer specified in the FF&E package will receive, store, if required, transport to the project site, off load, inside deliver, unpack, assemble, place/install, clean, if required, and dispose of all the trash for all furniture and furnishings. The Contractor's Interior Designer will be responsible for specifying

installation services and warehousing, as required, for all collateral equipment. It is the Contractor's responsibility to coordinate the building completion, occupancy, and furniture installation dates with the installation dealer specified in the FF&E package. Any costs associated with storing or delaying furniture shipments is the responsibility of the Contractor.

E2020 1.2.10 Installation Warranty

Install all movable furnishings in accordance with the manufacturer’s instructions and warranty requirements. All movable furnishings must be level and aligned and all doors, drawers and accessories must be level and aligned to open, close and otherwise operate smoothly and securely. All systems furniture must be installed by the systems furniture manufacturer’s dealer of record and not the General Contractor. Repair, to the customer’s satisfaction, any/all damage to any facility finish that is a result of the furniture installation and correct all punch list items for the furniture/furnishings.

E2020 1.2.11 Ordering Documentation

Provide two copies of all ordering documentation to the Contracting Officer including Factory Order number (FO) and warranty information.

E2020 1.2.12 Post Award Changes

After award of the FF&E line item modification, any request to change the FF&E items must be submitted on the Contracting Officer. The FF&E modification has been accepted, priced, and negotiated based on specific line items as detailed in the final package. Those items have been agreed to considering color, specific type and quality of material, price, sustainability, life cycle, and dealership service. The Government will expect and require the Contractor to provide exactly those items. Should changes become necessary, careful consideration is required to ensure that equivalent quality, price and other aspects of the item are maintained. Otherwise, price adjustments must be negotiated. The Contracting Officer will obtain approval from the Government Interior Designer/Collateral Equipment Manager in consultation with the client for any changes to the FF&E.

Post award FF&E manufacturer's price increases are the responsibility of the Contractor and will not be transferred to the government. Recommend ordering FF&E product once funds are received to avoid incurring additional costs. Delayed production and delivery dates can be noted at the time of order placement to coincide with building completion dates.

E2020 1.3 BEST VALUE DETERMINATION

A best value determination is required by Federal Acquisition Regulation (FAR) 8.404 when placing orders against Federal Supply Schedules for the selection of furniture and furnishings. A Best Value

Determination (BVD) must also be provided for FF&E installation services. Best Value is defined in FAR 2.101 as ensuring that the order to be placed under a Federal Supply Schedule results in the lowest overall cost alternative (considering price, special features, administrative costs and client's needs) to meet the government's needs.

The Contractor's Interior Designer is responsible for the following written BVD justifications:

$3,000 or less: For any procurement in the FF&E package with a value of $3,000 or less, the Interior Designer may utilize any BPA holder. If the BPA holders cannot supply the item, then any other manufacturer may be utilized.

Greater than $3,000 and $150,000 or less: for any procurement in the FF&E package with a value greater than $3,000 and $150,000 or less, the Contractor's Interior Designer must always review pricing from at least three manufacturers as well as UNICOR. In addition to the review of published list prices, the Contractor's Interior Designer must confirm the pricing with the vendor. Manufacturer's quotes are NOT required. The BVD form must be completed and submitted for all FF&E procurements greater than $3,000 and $150,000 or less.

Greater than $150,000: The Contractor's Interior Designer must solicit proposals from all BPA holders under the applicable group for FF&E procurements greater than $150,000. UNICOR must always be solicited. The Contractor's Interior Designer must develop performance criteria and project requirements based on a generic design for the BPA holders and UNICOR to develop a price and performance proposal. The BVD form must be completed and submitted for all FF&E procurements greater than $150,000 and manufacturer's quotes and a summary of all proposals must be attached.

Federal Prison Industries (UNICOR) must be considered as part of all BVDs. This must be done by sending an email with the requirements and evaluation criteria if they are not comparable in one or more areas of price, quality, and time of delivery, the designer can specify product under NAVSUP BPA or GSA schedule.

The best value determination must address issues such as space planning; human factors data related to anthropometrics (reach, clearance, adjustability), space, and acoustics; ergonomics; product quality (including construction and materials); sustainability features, product warranties; history of the product and/or manufacturer; ability to service products through dealers or others within a certain geographical range of the project; price (including freight); aesthetics; appropriateness; and lighting, power and telecommunications systems management and/or coordination as related to the facility (when applicable); and other project specific factors as identified and/or required. Emphasis must be to create a fully integrated design solution by providing quality products to meet the functional needs of the customer. Customer preferences must be considered. The focus must be on the best overall value. Use the GSA Best Value Determination forms provided in Part 6 of this RFP as guidelines for information to be provided.

E202001 MOVABLE ART WORK

Provide artwork for wall installation as part of the FF&E Submittal according to the project program. Installation of artwork to be completed by installation dealer specified in the approved FF&E package. Type of artwork to be determined by client requirements and budget as described in the Project Program for the project. Install framed artwork 63 inches (1600 mm) on center above finished floor. Include security mounting hardware as required.

E202002 MODULAR PREFABRICATED FURNITURE

E202002 1.1 FURNITURE SYSTEMS

Provide products that meet the NAVFAC performance specifications for systems furniture. The Government Interior Designer must approve any other systems furniture manufacturer. The typical workstation must maximize each allocated space with worksurfaces and overhead closed storage with a surface to accommodate a Government provided computer. An attached articulated keyboard/mouse tray must be selected or provided. Provide a monitor lift if required by the project program.

Powered raceways that will accommodate data and voice wire management must be completely coordinated with all facility systems. The Contractor's Interior Designer must ensure the coordination of all electrical/data and furniture locations. Use of power poles will not be permitted to power FF&E. Provide and coordinate all telecommunication receptacles and outlet requirements (i.e. RJ 11/45 receptacles and cover plates) with the Contractor's Interior Designer and the systems furniture installer. Hardwire all pre-wired furniture with the building systems, and coordinate all Information technology (IT) and telephone connections.

E202002 1.2 MODULAR FREESTANDING FURNITURE AND WORKSTATIONS

Provide products that meet the NAVFAC performance specifications for modular freestanding furniture including wood. Provide modular furniture with electrical/data cable trays and grommet holes for private offices and smaller work areas. An attached articulated keyboard/mouse tray (and monitor lift if required by the project program) must be selected. Provide wood surfaces as appropriate. Include accommodation for a Government provided computer and printer.

E202003 FREESTANDING FURNITURE

E202003 1.1 SEATING

E202003 1.1.1 Task Seating

Provide task seating that is fully ergonomic and coordinated by finish and scale to the workstation. Seating specifications to include: adjustable arms, back, height, and seat pan; 5 star base, appropriate castors for floor surface, lumbar support and availability in a minimum of two (2) sizes. Task seating can be from the same manufacturer as the systems or major furniture supplier or other seating manufacturer as approved by the

government Interior Designer, provided it is determined to be a BPA "Best Value".

E202003 1.1.2 Lounge, Reception and Guest Seating

Provide lounge, reception and guest seating with upholsteries consistent with the Project Program. Seating must be easily reupholstered or have removable covers.

E202003 1.1.3 Training Room Seating

Provide seating with passive ergonomic features in that the seat and back offers some synchronized movement to allow the person seated to change positions. The support can be legs, sled base or single pedestal with 5 star base and casters as determined by user requirements. Provide high density stack chairs or nesting chairs as required. Provide attached, storable tablet arm as required.

E202003 1.2 STORAGE AND FILING

Provide freestanding storage units, file cabinets and file safes to accommodate the specific and unique storage requirements of the user. Coordinate closely with storage provided in PTS Section E10, *Equipment*, for high density filing.

E202003 1.3 CHILD DEVELOPMENT CENTERS

Provide all child care and classroom furnishings such as cribs, rocking chairs, feeding chairs, tables, seating, toy storage, book display storage, activity centers, freestanding floor activity toys, and any other required furnishings. Outdoor structural play equipment may be required. The cribs must be of stainless steel construction. The chairs and tables must be appropriately sized for each age group.

E202003 1.4 TRAINING/CONFERENCE ROOM FURNISHINGS

E202003 1.4.1 Tables

Provide single or multi-person worksurfaces or tables as determined from user requirements. Where computers are used, provide tables with wire management capability or pre-wired tables to accommodate data/telecommunications requirements. Powered raceways that will accommodate data and voice wire management must be completely coordinated with all facility systems. The Contractor's Interior Designer must ensure the coordination of all electrical/data and furniture locations. Provide and coordinate all telecommunication receptacles and outlet requirements, hardwire all pre-wired furniture with the building systems and coordinate all IT and telephone connections.

E202003 1.4.2 Movable Presentation Furnishings

Provide audio-visual carts, lecterns, multi-media presentation cabinets to accommodate power/data requirements.

E202003 1.5 DINING ROOM FURNISHINGS

E202003 1.5.1 Cafeteria, Dining Hall Furnishings

Provide stackable seating and associated dollies for transport and storage, tables with folding or fixed legs or flip tops, and associated mobile carts for transport and storage, and trash and recycling containers.

E202003 1.5.2 Executive Dining Furnishings

Provide premium quality dining furnishings to include tables, chairs, buffet and serving units, hutches and cabinets as require by the Project Program.

E202004 RUGS & ACCESSORIES

E202004 1.1 RUGS

Provide Area or Accent rugs. Refer to the Project Program for requirements.

E202004 1.2 LAMPS

Provide decorative lamps. Refer to the Project Program for requirements.

E202004 1.3 INTERIOR LANDSCAPING

Provide artificial plants of a variety of sizes and 'species' to provide interior landscaping, including planters or containers for artificial plants to coordinate with the interior finishes and furnishings of the project.

E202004 1.4 OTHER DECORATIVE ITEMS

Refer to the Project Program for requirements.

E202090 OTHER MOVABLE FURNISHINGS

E202090 1.1 MISCELLANEOUS ITEMS

E202090 1.1.1 Containers

Provide waste receptacles, recycling containers, and ash urns as required.

E202090 1.1.2 Accessories

Provide clocks, wall mounted or freestanding literature and coat racks, and mirrors as required.

E202090 1.1.3 Small Equipment

Provide small appliances such as coffee pots, microwaves,

refrigerators, washers, dryers, and icemakers, as required.

E202090 1.1.4 Special Equipment

Provide mailroom work and storage tables, mail sorter units, carts and equipment tables as required.

-- End of Section --

SECTION F10

SPECIAL CONSTRUCTION
09/22

F10 GENERAL

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

F10 1.1 DESIGN GUIDANCE

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

Industry standards, codes, and Government standards referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Federal Facility Criteria (FFC) at the Whole Building Design Guide (WBDG) website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award.

F10 1.1.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s): UFC 3-101-01, Architecture UFC 3-301-01, Structural Engineering)
UFC 1-200-02	High Performance and Sustainable Building Requirements

F10 1.2 PERFORMANCE VERTIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory special construction system performance via Performance Verification Testing, as detailed in this

section of the RFP. Provide special tests and special inspections in accordance with Part 2 Section 01 45 00, *Quality Control*.

F10 1.3 DESIGN SUBMITTALS

Provide design submittals in accordance with Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine Corps Design Procedures*, UFC 3-101-01, *Architecture*, and UFC 3-301-01, *Structural Engineering*.

F10 1.4 CONSTRUCTION SUBMITTALS

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

All structural elements necessary for construction.

For a pre-engineered metal building, provide shop drawings showing engineering data and complete building drawings, signed and sealed by a registered professional engineer.

F1010 SPECIAL STRUCTURES

F101001 METAL BUILDING SYSTEMS

F101001 1.1 DESIGN REQUIREMENTS

The metal building manufacturer must be accredited in accordance with all Parts of the Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems (AC472) by the International Accreditation Service, Inc. Design the Metal Building System in accordance with the Metal Building Manufacturers Association (MBMA) Low Rise Manual.

All structural design must comply with the provisions of PTS Section B10, Superstructure. The steel structure must be as designed by the structural engineer. If used for thrust bracing, tie rods must be concrete encased. Design framed openings structurally.

F101001 1.1.1 Additional Roof Design Requirements

a. Roof Decking – In addition to any other load requirements, roof decking must be designed to support a 200-pound (91 kg) concentrated load at mid-span on a 12-inch (300 mm) wide section of deck.
b. When used as a diaphragm, roof decks must be designed in accordance with SDEI DDM.

F101001 1.1.2 Deflection

a. Structural Members

1) Maximum deflection of main framing members and for roof

members must not exceed values required by the International Building Code (IBC).

2) Purlins and Roof Panels: The deflection due to live, snow, or wind must not exceed L/180. The Basis of Design must establish that the roof when deflected under dead plus live or snow loads will not result in a negative gradient. Maximum deflections must be based on sheets continuous across two or more supports with sheets unfastened and free to deflect. Provide bracing of purlin compression flanges as required to resist applied loading.

b. Wall Panels - Maximum deflection of wall panels due to wind loads must be as required by the IBC and UFC.

F101001 1.2 WALL AND ROOF MATERIALS

F101001 1.2.1 Aluminum/Zinc-Coated Steel Sheet

American Society for Testing and Materials (ASTM) A792/ A792M, AZ 55.

F101001 1.2.2 Aluminum Sheet

Alloy 3004 Alclad conforming to ASTM B209.

F101001 1.3 FRAMING AND STRUCTURAL MEMBERS

F101001 1.3.1 Steel

ASTM A992 / A992M, ASTM A529/ A529M, ASTM A572/ A572M, or ASTM A588/ A588M.

F101001 1.3.2 Aluminum

ASTM B221 or ASTM C308.

F101001 1.3.3 Structural Tube

ASTM A500 or ASTM B221.

F101001 1.4 MISCELLANEOUS ITEMS

F101001 1.4.1 Fasteners

Fasteners must be compatible with the materials they are fastening to, be gasketed when exposed to weather to prevent leaks, and must provide both shear and tensile strengths not less than 750 pounds (3,336 N) per fastener. The main fastening system must use concealed fasteners, however, when exposed fasteners are needed, color fasteners must be color coated to match wall/roof panels.

F101001 1.4.2 Light Transmitting Roof Panels (Non-Insulated)

ASTM D3841, Type II, Grade 1

F101001 1.4.3 Insulation

Blanket-type fiberglass insulation with a factory applied facing on one side and having a permeance rating of 0.05 or less in accordance with ASTM E96.

a. Flame Spread Rating 75 or less, and a Smoke Developed Rating of 150 or less when tested in accordance with ASTM E84.
b. Insulation R-value in accordance with ASTM C236 as determined by energy use analysis or identified in the RFP.

F101001 1.5 FINISH

Factory Color Finish - Provide factory applied baked coatings to the exterior and interior of metal wall panels and metal accessories. Provide exterior finish top coat of 70 percent inorganic pigments with 0.8 mil dry film thickness (DFT). Provide exterior primer standard with panel manufacturer but not less than 0.8 mil DFT over the color topcoat and edge coating for projects within 300 feet (91 meters) of a water shoreline or industrial environments. Field apply 70 percent PVDF clear coat to unfinished panel edges or field cut panels. Interior finish exposed to sun or rain must be the same coating and DFT as the exterior coating. Interior finish protected from sun or rain exposure must receive 1.0 mil DFT coating of siliconized polyester (SMP) resin coating with organic or blended pigments and manufacturer's standard primer.

F1030 SPECIAL CONSTRUCTION SYSTEMS

F103001 VAULTS

This paragraph is for prefabricated vaults. See PTS Section E10, Equipment, for vault doors and day gates.

-- End of Section --

SECTION F20

SELECTIVE BUILDING DEMOLITION
09/22

F20 GENERAL

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

F20 1.1 DESIGN GUIDANCE

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

Industry standards, codes, and government standards that are referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Federal Facility Criteria (FFC) at the Whole Building Design Guide (WBDG) website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award.

F20 1.1.1 Industry Standards

Refer to UMRL for reference designation identification.

F20 1.1.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s): UFC 1-200-02, High Performance and Sustainable Building Requirements UFC 3-201-01, Civil Engineering UFC 3-101-01, Architecture)
UFC 3-810-01N	Navy and Marine Corps Environmental Engineering for Facility Construction

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS 01 57 19	Temporary Environmental Controls
UFGS 02 82 00	Asbestos Remediation
UFGS 02 83 00	Lead Remediation
UFGS 02 84 16	Handling of Lighting Ballasts and Lamps Containing PCBs and Mercury
UFGS 02 84 33	Removal and Disposal of Polychlorinated Biphenyls (PCBs)
UFGS 02 85 00	Mold Remediation
UFGS 31 21 13	Radon Mitigation

U.S. ARMY CORPS of ENGINEERS (USACE)

EM 385 -1-1	Safety -- Safety and Health Requirements or latest edition including changes

F20 1.2 QUALITY ASSURANCE

Materials and assemblies installed in the work must be inspected and found to be in compliance with industry standards prior to acceptance of the work. Items found not to be in compliance must be removed, or corrective measures taken, to assure compliance with the referenced standard. Disposal of materials must be as specified and performed in a manner to protect workers and existing structures to remain.

F20 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE CRITERIA

Compliance with the requirements will be determined by a review of the design and construction submittals and by field inspection. See Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, and Part 2 Section 01 33 00.05 20, *Construction Submittal Procedures*, for additional requirements.

F20 1.4 DESIGN SUBMITTALS

Provide design submittals in accordance with Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine Corps Design Procedures*, and UFC 3-810-01N, *Navy and Marine*

Corps Environmental Engineering for Facility Construction.

F20 1.5 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements and if applicable to this project, the Designer of Record (DOR) must obtain governing body approval for the construction submittals contained in the following UFGS sections and USACE Safety Manual as a minimum:

UFGS 01 57 19, *Temporary Environmental Controls*

UFGS 02 82 00, *Asbestos Remediation*

UFGS 02 83 00, *Lead Remediation*

UFGS 02 84 16, *Handling of Lighting Ballasts and Lamps Containing PCBs and Mercury*

UFGS 02 84 33, *Removal and Disposal of Polychlorinated Biphenyls (PCBs)*

UFGS 02 85 00, *Mold Remediation*

UFGS 31 21 13, *Radon Mitigation*

EM 385-1-1, *Safety and Health Requirements*, latest edition including changes

a. Engineering Safety Survey

b. Demolition Plan/ Deconstruction Plan

F2010 BUILDING ELEMENTS DEMOLITION

All demolition materials and appurtenances must be properly disposed of in accordance with all applicable regulations. Maximize the use of deconstruction and recycling services. Before demolition can commence, any hazardous materials must be abated in accordance with the requirements of the ESR and other parts of the RFP. Provide a Demolition Plan/ Deconstruction Plan that is based on a Registered Engineers Survey in accordance with EM 385-1-1 and has been approved by the DOR. Obtain approval from the Contracting Officer for the proposed demolition plan and work/outage schedule prior to demolition activities.

F2010 1.1 GENERAL DEMOLITION

The work includes demolition, salvage of identified items and materials and removal of resulting rubbish and debris. Remove rubbish and debris from Government property daily, unless otherwise directed. Materials that cannot be removed daily must be stored in areas specified in the approved Demolition Plan as described in Part 2 Section 01 57 19.

F2010 1.2 UTILITIES

Remove existing utilities and terminate in a manner conforming to the nationally recognized code covering the specific utility. Disturbance to utilities cannot cause a failure to utilities to remain operational, unless a planned outage is approved by the FEAD/ROICC and coordinated with on-site personnel.

F2010 1.3 DUST CONTROL

Perform dust control activities in accordance with approved Dirt and Dust Control Plan as described in Part 2 Section 01 57 19.

F2010 1.4 TRAFFIC CONTROL

Where pedestrian, vehicle, aircraft safety is endangered, use traffic barricades.

F2010 1.5 WEATHER PROTECTION

For portions of the building to remain, protect building interior, materials, and equipment from weather at all times.

F2010 1.6 BURNING

Perform burning operations in accordance with ESR Section F20.

F201001 SUBSTRUCTURE & SUPERSTRUCTURE

Perform substructure or superstructure demolition work in accordance with ESR Section F20.

F201002 EXTERIOR CLOSURE

Perform exterior closure demolition work in accordance with ESR Section F20.

For occupied buildings ensure openings to the exterior are secured by the end of the work shift.

F201003 ROOFING

Perform roofing demolition work in accordance with ESR Section F20.

For removal and re-roofing projects, remove only as much roofing as can be re-covered by the end of the work shift.

F201004 INTERIOR CONSTRUCTION & FINISHES

Perform interior construction & finishes demolition in accordance with ESR Section F20.

F201005 CONVEYING SYSTEMS

Perform conveying systems demolition in accordance with ESR Section F20.

F201006 MECHANICAL SYSTEMS

Perform mechanical systems demolition in accordance with ESR Section F20.

F201007 ELECTRICAL SYSTEMS

Perform electrical systems demolition in accordance with ESR Section F20.

F201008 EQUIPMENT & FURNISHINGS

Perform special equipment and furnishing demolition in accordance with ESR Section F20.

F201009 OTHER NON-HAZARDOUS SELECTIVE BUILDING DEMOLITION

Perform non-hazardous selective building demolition in accordance with ESR Section F20.

F2020 HAZARDOUS COMPONENTS ABATEMENT

Perform work in accordance with specification and plans provided in Parts 5 and 6.

F2020 1.1 PRIVATE QUALIFIED PERSON (PQP)

The PQP must perform independent inspections, testing and verification of the hazardous components work as indicated in ESR Section F20 and the approved work plans as described in Part 2 Section 01 57 19. The PQP must be appropriately licensed in the state in which the work will be performed.

F2020 1.2 FURNISHINGS

The government must remove all uncontaminated furnishings and equipment from the work area prior to the start of the work.

F2020 1.3 OZONE DEPLETING SUBSTANCES (ODS)

Perform ozone depleting substances (ODS) related work as indicated in the RFP and in accordance with Section 01 57 19.

F2020 1.4 DISPOSAL

All waste materials will become the property of the Contractor and must be transported, disposed of and recycled in accordance with the approved disposal plan as described in Part 2 Section 01 57 19.

F202001 *SUBSTRUCTURE & SUPERSTRUCTURE*

F202002 *EXTERIOR CLOSURE*

F202003 *ROOFING*

F202004 *INTERIOR CONSTRUCTION & FINISHES*

F202005 *CONVEYING SYSTEMS*

F202006 *MECHANICAL SYSTEMS*

F202007 *ELECTRICAL SYSTEMS*

F202008 *EQUIPMENT & FURNISHINGS*

F202009 *OTHER HAZARDOUS SELECTIVE BUILDING DEMOLITION*

Perform all other building components abatement work in accordance with ESR Section F20.

-- End of Section --

SECTION G10

SITE PREPARATION
09/22

G10 GENERAL

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

G10 1.1 DESIGN GUIDANCE

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

Industry standards, codes, and Government standards referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Federal Facility Criteria (FFC) at the Whole Building Design Guide (WBDG) website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the referenced standard at the time of contract award.

G10 1.1.1 Industry Standards and Codes

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

Refer to UMRL for reference designation identification.

G10 1.1.2 Government Standards

CORPS OF ENGINEERS (COE)

COE EM 385-1-1	Safety and Health Requirements Manual

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the

	following significant UFC(s): UFC 1-200-02, High Performance and Sustainable Building Requirements UFC 3-201-01, Civil Engineering UFC 3-220-01, Geotechnical Engineering)
UFC 3-810-01N	Navy and Marine Corps Environmental Engineering for Facility Construction

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS 31 00 00	Earthwork
UFGS 01 57 19	Temporary Environmental Controls
UFGS 02 61 13	Excavation and Handling of Contaminated Material
UFGS 02 61 23	Removal and Disposal of PCB Contaminated Soils
UFGS 02 65 00	Underground Storage Tank Removal

G10 1.2 PERFORMANCE VERIFICATION AND ACCEPTABLE TESTING

Compliance with the requirements will be determined by a review of the design and construction submittals and by field inspection. See Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, and Part 2 Section 01 33 00.05 20, *Construction Submittal Procedures*, for additional requirements. Verify earthwork performance via testing detailed in the paragraph, "Field Quality Control", in UFGS Section 31 00 00, Earthwork.

G10 1.3 DESIGN SUBMITTALS

Submit design submittals in accordance with Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, UFC 3-201-01, *Civil Engineering*, and UFC 3-220-01, *Geotechnical Engineering*.

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

UFGS 31 00 00, *Earthwork.*

Provide sustainability submittals in accordance with Part 2 Section 01 33 29, *Sustainability Requirements and Reporting*.

G10 1.4 CONSTRUCTION SUBMITTALS

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

Submittals in Part 2 UFGS Section 01 57 19, *Temporary Environmental Controls.*

Submittals in UFGS Section 02 61 13, *Excavation and Handling of Contaminated Material*

Submittals in UFGS Section 31 00 00, *Earthwork*.

Submittals in UFGS Section 02 61 23, *Removal and Disposal of PCB Contaminated Soils.*

Submittals in UFGS Section 02 65 00, *Underground Storage Tank Removal.*

Waste Management Plan in accordance with Part 2 UFGS Section 01 74 19, *Construction Waste Management and Disposal*.

Provide sustainability submittals in accordance with Part 2 UFGS Section 01 33 29, *Sustainability Requirements and Reporting*.

G10 1.5 GEOTECHNICAL REPORT

G10 1.5.1 Subsurface Soils Information

Provided subsurface soil information is included for the Contractor's information only, and is not guaranteed to fully represent all subsurface conditions. The data included in this RFP is intended for proposal preparation and preliminary design only. Perform, at the Contractor's expense, such subsurface exploration, investigation, testing, and analysis for the design and construction of the site improvements.

G10 1.5.2 Contractor-provided Geotechnical Engineer

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

Coordinate work by the Contractor-provided Geotechnical Engineer at the project location with the Contracting Officer so as not to interfere with normal base operations. A minimum of two weeks prior to the Foundation Work Design submittal, provide the

Contractor's Geotechnical Report (a searchable Adobe Acrobat PDF version on CD and two printed copies) for review and record keeping purposes. The report will become the property of the Government. Provide the geotechnical reports generated during construction, such as pile driving results and analysis, to the Contracting Officer. In addition, provide a searchable Adobe Acrobat PDF version and two printed copies for record keeping purposes.

G10 1.5.3 Contractor-Provided Geotechnical Report

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

a. The project site description, vicinity map and site map indicating the location of borings and any other sampling locations. Provide 24 hour groundwater observations for at least 20 percent of the borings, minimum one boring. Provide notes explaining any abbreviations or symbols used and describing any special site preparation requirements.

b. Results of field and laboratory testing, whether Government or Contractor-provided. Address existing subsurface conditions, selection and design of the foundation and floor slab, underground construction including utility installation and other site specific requirements (such as soil stabilization and slope stability).

c. Engineering analysis, discussion and recommendations Addressing:

1) Settlement analysis - Limit settlement in accordance with UFC 3-220-01 *Geotechnical Engineering* and EM 1110-1-1904 "Settlement Analysis".

2) Bearing Capacity analysis.

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

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

5) Sheeting and shoring considerations.

6) Pavement design calculations with parameters defined, actual or assumed, and recommended thicknesses and materials.

7) Infiltration rate.

8) Haul routes and stockpile locations for earthwork.

9) Calculations to support conclusions and recommendations.

10) Present recommendations on a structure-by-structure basis.

A registered Geotechnical Engineer is required to sign the Geotechnical Report.

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

G10 1.5.4 Geotechnical Site Data required in Design Drawings

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

a. Logs of Borings and related summary of laboratory test results and groundwater observations. Provide 24 hour groundwater observations for at least 20 percent of the borings, minimum one boring. Provide notes explaining any abbreviations or symbols used and describing any special site preparation requirements.

b. Indicate the locations of borings on the drawings. Revise the design drawings to reference the Contractor's Geotechnical Report as being a basis for design.

G1010 SITE CLEARING

G1010 1.1 GENERAL

Clear and grub project site for project construction.

G1010 1.2 BURNING

Where burning is permitted, adhere to the federal, state, and local regulations.

G101001 CLEARING

G101001 1.1 CLEARING

Clear trees, shrubs, brush and vegetation for construction of the project. Clearing includes the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within the areas to be cleared.

This project site does not have saleable timber.

Burning will not be permitted.

G101002 TREE REMOVAL

Remove trees as required for project construction.

G101003 STUMP REMOVAL

Remove all stumps under building foundations, roads, parking areas, hard stands, and storage areas as required for project construction.

Remove stumps to a depth of at least 18 inches (450 mm) below ground surface. Fill depressions with satisfactory material and compact. Mound fill 2 inches (50 mm) above adjacent surface to allow for settling when not part of a subbase.

G101004 GRUBBING

Grub as required for construction of the project.

Within the clearing limits, remove and dispose of logs, shrubs, brush, matted roots, roots larger than 2 inches (50 mm) in diameter, and other debris to a depth of at least 18 inches (450 mm) below ground surface. Fill depressions made by grubbing with satisfactory material and compact to make the new surface conform to the adjacent surface of the ground.

G101006 DEBRIS DISPOSAL

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

Prevent spillage on pavements, streets, or adjacent areas. Dispose of surplus and unsuitable material off of Government property.

G1020 SITE DEMOLITION & RELOCATIONS

G1020 1.1 GENERAL

Demolition work includes the demolition, removal and legal disposal of existing construction debris to accommodate the new construction. Take precautions to prevent damages to existing utilities, construction and materials not scheduled for demolition, repair or replacement; repair damages to the construction and materials to the satisfaction of the Contracting Officer and at no additional cost to the Government.

G1020 1.2 AUTHORIZATION

Do not begin demolition until the Demolition Plan has been approved by, and authorization is received from, the Contracting Officer.

G1020 1.3 TITLE TO MATERIALS

Whenever possible, salvage or recycle features demolished in lieu of disposing of as waste in a landfill. Existing features to be demolished which are not salvageable or reused become the property of the Contractor, and must be removed from the project site. The Government will not be responsible for the condition, loss of, or damage to, such property after contract award. Materials and equipment cannot be viewed by prospective purchasers or sold on the site.

G1020 1.4 REUSE OF MATERIALS AND EQUIPMENT

Remove and store materials and equipment to be reused or relocated to prevent damage, and reinstall as the work progresses.

G1020 1.5 SALVAGED MATERIALS AND EQUIPMENT

Deliver salvaged materials and equipment that are to be removed by the Contractor and that are to remain the property of the Government to a storage site on the installation, in accordance with instructions of the Contracting Officer.

G102001 BUILDING MASS DEMOLITION

Refer to Section F20, *Selective Building Demolition*, for additional information.

G102002 ABOVEGROUND SITE DEMOLITION

G102002 1.1 DUST AND DEBRIS CONTROL

Prevent the spread of dust and debris to occupied portions of a building or on pavements and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water for dust control if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution. Sweep pavements to control the spread of debris that may result in foreign object damage potential to aircraft.

G102002 1.2 PROTECTION

G102002 1.2.1 Traffic Control

Where pedestrian and driver safety is endangered in the area of removal work, provide traffic control in accordance with FHWA Manual on Uniform Traffic Control Devices (MUTCD).

G102002 1.2.3 Existing Work

Protect existing work that is to remain in place, be reused, or remain the property of the Government. At no additional expense to the Government, repair items that are damaged during performance of the work to original condition, or replace with new. Do not overload pavements to remain.

G102002 1.3 PAVING AND SLABS

Remove concrete and asphaltic concrete paving and slabs as required for construction of project. Remove the existing aggregate base in areas to receive new pavement to the depth of the proposed pavement section below new finish grade. Remove the existing aggregate base in areas not to receive new pavement to a depth of 8 inches (200 mm) below existing adjacent grade and break remaining pavement (if any) to allow drainage. Provide neat sawcuts at limits of pavement removal; protect sawcuts so that new pavement butts against the existing without feathering.

G102003 UNDERGROUND SITE DEMOLITION

G102003 1.1 UTILITY TERMINATION

Terminate utilities in accordance with state and local rules and regulations; the nationally recognized code; and the requirements of the utility provider covering the specific utility; UFC 3-201-01, *Civil Engineering*; and approved by the Contracting Officer.

G102003 1.2 PROTECTION OF EXISTING UTILITIES

Protect existing utilities to remain. Where removal of existing utilities and pavement is required, provide approved barricades, temporary covering of exposed areas, and temporary services or connections. Repair damage to existing utilities to remain at no additional expense to the Government.

G102004 BUILDING RELOCATION

Refer to Section F20, *Selective Building Demolition*, for additional information.

G102005 UTILITY RELOCATION

Repair relocated items that are damaged or replace damaged items with new undamaged items at no additional expense to the Government.

G102006 FENCING RELOCATION

This project site does not require fencing relocation.

G102007 SITE CLEANUP

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

Remove rubbish and debris from the installation daily; do not allow accumulations inside or outside the building(s) or on pavements. Store materials that cannot be removed daily in areas specified by the Contracting Officer.

G102007 1.1 SPILLS

In the event of a spill or release of hazardous substances, pollutant,

contaminant or oil, notify the Contracting Officer immediately. Take immediate containment actions to minimize the effect of any spill or leak in accordance with the ESR and the approved spill work plan as described in Part 2 Section 01 57 19, *Temporary Environmental Controls*. Perform clean up at no additional expense to the Government.

G1030 SITE EARTHWORK

G1030 1.1 GENERAL

This section includes the design and construction requirements for earthwork and grading related to construction of the roadways, parking, paved areas and other related sitework. Refer to Section A10, *Foundations*, for earthwork related to construction of structures, including building, footings, foundations, retaining walls, slabs, tanks, and utility appurtenances.

The Designer of Record is required to utilize UFGS Section 31 00 00, *Earthwork*, for the project specification, and to submit the edited specification section as a part of the design submittal for the project.

G103001 GRADING

Provide site grading in accordance with the requirements of UFC 3-201-01, *Civil Engineering*.

G103001 1.1 ELEVATIONS

Establish finish floor elevations in accordance with UFC 1-200-01, *DoD Building Code*(*General Building Requirements)*, and UFC 3-101-01, *Architecture*.

G103001 1.2 SITE GRADING

Grade the site such that associated storm water runoff does not adversely affect surrounding sites. Preserve natural topographic features to minimize the impact on the existing drainage patterns at and adjacent to the site.

G103001 1.3 FINISHED SURFACES

Provide finish grading with drainage towards new and existing drainage features and with no resulting low spots that hold water or that direct runoff towards new or existing facilities or site amenities.

G103001 1.4 RODENT AND VEGETATION CONTROL

Prevent and eliminate standing water.

G103002 COMMON EXCAVATION

Preserve natural topographic features to minimize cut and fill requirements. Unsuitable material and surplus excavation becomes the property of the Contractor, and must be disposed of as indicated in the Project Program.

G103003 ROCK EXCAVATION

Hard materials and rock is not anticipated to be encountered during the excivation.

Blasting will not be permitted.

G103004 FILL & BORROW

G103004 1.1 SOURCES

Where sufficient topsoil and satisfactory materials are not available on the project site, provide suitable borrow materials.

G103004 1.2 REQUIREMENTS FOR OFF SITE SOIL

Test off-site soil in accordance with UFGS Section 31 00 00, *Earthwork*, section titled "Requirements for Off Site Soil".

G103004 1.3 UNSATISFACTORY SOIL MATERIALS

Remove uncontaminated unsatisfactory soil materials from the site. Unsatisfactory materials are materials which do not comply with the requirements for satisfactory materials. Unsatisfactory materials also include man-made fills, trash, refuse, backfills from previous construction or material classified as satisfactory which contains root and other organic matter, frozen material, and stones larger than 3 inches. The Contracting Officer shall be notified of any contaminated materials.

G103004 1.4 TOPSOIL

Refer to Section G2050, "Landscaping". Remove unsatisfactory, existing topsoil from the site in accordance with the Project Program.

G103005 COMPACTION

Provide compaction to meet requirements using ASTM D1557 (Modified Proctor). Adjust soil moisture by drying or additional water to achieve optimum moisture content for compaction requirement. Project compaction requirements are as follows:

- Load bearing areas (such as structures, foundations, concrete slabs, vehicular pavements, and site walls - retaining or free-standing): Compact top 12 inches of subgrade and subsequent structural fill to 95 percent using ASTM D1557.

- Not load bearing areas (such as green or open areas): Compact to 85 percent of ASTM D1557.

G103006 SOIL STABILIZATION

Provide soil stabilization designed to function as required by site conditions in accordance with the State Highway specifications and standards in the state where the project is located. Apply and install geosynthetics in accordance with the manufacturer's written instructions.

G103007 SLOPE STABILIZATION

Provide slope stabilization methods in accordance with the State Highway specifications and standards in the state where the project is located. Design and install manufactured products, gabions, geogrids, rock anchors in accordance with the manufacturer's written instructions.

G103008 SOIL TREATMENT

G103008 1.1 TERMITE CONTROL

Refer to Section A1010 1.2, "Termite Control".

G103009 SHORING

Provide sheeting, shoring, bracing, cribbing and underpinning in accordance with the Army Corps of Engineer's Safety and Health Requirements Manual (COE EM 385-1-1), UFC 3-220-01, *Geotechnical Engineering*, UFC 3-301-01, *Structural Engineering*, and other Federal, State and local codes and requirements.

Provide protection of existing structures.

G103010 TEMPORARY DEWATERING

The design of the temporary dewatering system is required to account for soil conditions, rainfall, fluctuations in the groundwater elevations and the potential settlement impact on adjacent facilities due to dewatering. Provide dewatering in accordance with UFGS Section 31 00 00, *Earthwork*. While the excavation is open, maintain the water level continuously, at least 1.0 foot (0.30 m) below the working level.

French drains, sumps, ditches or trenches are not allowed within 3 feet (0.9 m) of the foundation of any structure without written approval of the Government's Civil/Geotechnical Reviewer.

G103011 TEMPORARY EROSION & SEDIMENT CONTROL

G103011 1.1 TEMPORARY EROSION & SEDIMENT CONTROL

Develop and implement temporary erosion and sediment control measures and other Best Management Practices (BMPs) prior to or in conjunction with commencement of earthwork in accordance with the state Erosion and Sediment Control Laws and Regulations. Remove non-permanent erosion control measures after vegetation is fully established.

G103011 1.2 MAINTENANCE

Maintain temporary erosion control measures in accordance with state Erosion and Sediment Control Laws and Regulations throughout the project until areas are fully stabilized.

G103090 OTHER SITE EARTHWORK

G103090 1.1 HISTORIC AND ARCHAEOLOGIC ARTIFACTS

Refer to Part 2 UFGS Section 01 50 00, *Temporary Construction*

Facilities and Controls.

G103090 1.2 PIPELINE CASING UNDER RAILROADS OR PAVEMENTS

Where required by code or local practice provide casing for piping under railroads or pavements. The Contractor is responsible for obtaining permits from government and nongovernment owners/agencies as required to perform the work.

G103090 1.3 TOPSOIL AND SEED

Provide topsoil and seed according to UFGS Section 31 00 00, *Earthwork*, except when landscaping is required.

G1040 HAZARDOUS WASTE REMEDIATION

Perform work in accordance with specification and plans provided in Parts 5 and 6.

G1040 1.1 DISPOSAL

Manage, transport and dispose of waste materials in accordance with specification and plans provided in Parts 5 and 6.

-- End of Section --

SECTION G30

SITE CIVIL/MECHANICAL UTILITIES
09/22

G30 GENERAL

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

G30 1.1 DESIGN GUIDANCE

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

Industry standards, codes, and Government standards referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Federal Facility Criteria (FFC) at the Whole Building Design Guide (WBDG) website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the referenced standard at the time of Contract award.

G30 1.1.1 Industry Standards and Codes

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

G30 1.1.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s): UFC 1-200-02, High Performance and Sustainable Building Requirements UFC 3-201-01, Civil Engineering UFC 3-230-01, Water Storage, Distribution, and Transmission UFC 3-240-01, Wastewater Collection

	UFC 3-240-01, Mechanical Engineering UFC 3-600-01, Fire Protection Engineering for Facilities)
UFC 3-460-01	Design: Petroleum Fuel Facilities

G30 1.2 QUALITY ASSURANCE

Materials and assemblies installed in the work must be inspected and found to be in compliance with industry standards and these specifications prior to acceptance of the work. Remove items found not to be in compliance, or take corrective measures, to assure compliance with the referenced standard. Perform field tests and provide labor, equipment and incidentals required for testing.

G30 1.2.1 Materials

Provide new materials that bear the label of the standardizing agency whenever standards have been established and label service is normally and regularly furnished by the agency. Equipment provided must be listed and suitably labeled for the specified purpose, environment, and application and installed in accordance with manufacturer’s recommendations.

G30 1.2.2 Additional Work

Provide such other labor and materials as are required for a complete and usable system in accordance with the requirements of the criteria listed, regardless of whether such materials and associated labor are called for elsewhere in this RFP.

G30 1.2.3 Qualifications of Well Drillers for Water Supply Wells

If required by the state waterworks' regulations, the well driller must be certified by the state and remain certified while constructing the well.

G30 1.2.4 Qualifications of Coating Contractors for Water Storage Tanks

Contractors and subcontractors that perform surface preparation or coating application must be certified by the Society for Protective Coatings (formerly Steel Structures Painting Council) (SSPC) to the requirements of SSPC QP 5 for the inspection firm prior to Contract award, and remain certified while accomplishing any surface preparation or coating application. The Coating Inspector must also be certified to Level II for exterior and Level III for interior coatings prior to and during the project.

G30 1.2.5 Qualifications of Oil Interceptor Manufacturers

Manufacturers must have five years of experience producing packaged oil interceptor units of similar size.

G30 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Compliance with the requirements will be determined by a review of the design and construction submittals and by field inspection. See Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, and Part 2 Section 01 33 00.05 20, *Construction Submittal Procedures*, for additional requirements.

Verify satisfactory utility system performance via Performance Verification Testing, as detailed in this section of the RFP. Verify satisfactory performance also via testing as detailed in the paragraph, "Field Quality Control", in UFGS Specification Sections utilized.

G30 1.3.1 Water Supply Well Performance Verification

Upon completion of the permanent well, conduct performance testing for well capacity, drawdown and pump equipment. Conduct water quality testing in accordance with AWWA A100 and its appendices and state regulations.

G30 1.3.2 Water Distribution System Verification Testing

Provide testing on water mains and service lines in accordance with the state waterworks' regulations and the following:

a. Ductile Iron and other materials: AWWA C600.
b. PVC: AWWA C605.

Where water mains and water service lines provide fire service, test in accordance with NFPA 24.

Do not begin testing on any section of a pipeline where concrete thrust blocks have been provided until at least 5 days after placing of the concrete.

G30 1.3.3 Fire Distribution System Verification Testing

Test water mains and water service lines providing fire service or water and fire service in accordance with NFPA 24. The additional water added to the system must not exceed the limits given in NFPA 24.

G30 1.3.4 Water Booster Pump Station Verification Testing

Test the water booster pump station in accordance with state regulations. Conduct testing on discharge and site piping in accordance with tests for water distribution mains; see G30, paragraph 1.3.2. Test pumps, controls, and alarms, in operation, under design conditions to ensure proper operation of equipment.

G30 1.3.5 Sanitary Sewer Distribution System Verification Testing

Provide testing on sewer mains and laterals in accordance with state regulations.

G30 1.3.5.1 VISUAL TEST

Perform a visual inspection of the existing sewer before making a connection to the existing sewer line. Verify existing sewer line does not connect to or drain to the storm drainage system. Visually inspect downstream manholes connecting the existing sewer as well as the upstream and downstream manholes where the point of connection will be made to verify that there is no potential for cross connection to the storm sewer system. Perform visual inspection in the presence of the Contracting Officer and Public Works PW6 field support. Obtain approval from the Contracting Officer before making the connection.

Perform a dye check from the project to the first manhole on the next active sewer branch main downstream from the sewer branch main used as the project point of connection. Continue testing until the dye visually confirms the design connection is appropriate. Utilize a nontoxic non-staining sewer tracing dye. During the test monitor the storm drainage system downstream from the project, via either manholes or outfalls for any sign of cross connection.

Perform a smoke test on the project sewer. Testing will verify that project storm drainage inlets or drains have not been connected to the sanitary sewer.

These tests must be observed by the Contracting Officer and the utility operator's inspector.

G30 1.3.5.2 Leakage Tests

Test lines for leakage by either infiltration tests or exfiltration tests, or by low-pressure air tests. Prior to testing for leakage, backfill trench up to at least lower half of pipe. To prevent pipeline movement during testing, place additional backfill around pipe sufficient to prevent movement, but leaving joints uncovered to permit inspection. The leakage allowance is indicated in AWWA C 600 for ductile iron pipelines; AWWA C 605 for polyvinyl chloride pipelines; and the state sewerage regulations, whichever is more stringent. When leakage or pressure drop exceeds the allowable amount make satisfactory correction and retest pipeline section in the same manner. Correct visible leaks regardless of leakage test results.

a. Exfiltration Tests:

ASTM C 969M (ASTM C 969) and perform calculations in accordance with its Appendix.

b. Low-pressure Air Tests:

i. Pipelines: ASTM C 924M (ASTM C 924) and perform calculations in accordance with its Appendix.

ii. PVC plastic pipelines: UBPPA UNI-PUB-6 and perform

calculations in accordance with its Appendix.

Deflection of pipe in the installed pipeline under external loads must not exceed 4.5 percent of the average inside diameter of pipe, in accordance with ASTM D 2412.

G30 1.3.5.3 TV Inspection for Sanitary Sewer

Complete the post-installation TV inspection to confirm that the completed lines are free of defects. For video recordings include an audio track recorded by the inspection technician during the actual inspection work describing the parameters of the line being inspected. The minimum information to be included is the pipe material, pipe size, starting and stopping manholes and descriptions of any features as they occur. Video recording playback must be at the same speed that it was recorded. Permanently label CDs / DVDs according to their contents; CDs / DVDs will become the property of the Government.

Provide TV inspections of sanitary sewer mains in accordance with the Pipeline Assessment and Certification Program as sponsored by the National Association of Sewer Service Companies (NASSCO). Prior to initiating CCTV inspection, provide copies of PACP Certification of the operators performing the work.

Complete pipe segments and manhole work, including pipe penetrations, manhole benches, main line and manhole visual inspection, pressure testing, deflection and leakage tests on a section of line (manhole to manhole) prior to performing TV.

Complete post-installation TV inspection in the presence of the Contracting Officer or designated representative.

The importance of accurate measurements is emphasized. The meter device must be accurate to one tenth of a foot.

Utilize the full capabilities of the camera equipment to document the completion and the conformance of the work to the Contract Documents. Provide a full 360 degree view of the pipe, joints and service connections. Move the camera through the line in either direction at a moderate rate, stopping to permit proper documentation of the sewer's condition. The maximum speed must be no greater than 30 feet per minute. Use manual winches, power winches, TV cable and powered rewinds or other devices that do not obstruct the camera view or interfere with the proper documentation of the sewer conditions to move the camera through the sewer line.

Once video recording has commenced, the recording must be continuous, without interruption, until the termination manhole is reached.

Provide a color video showing the completed work. Prepare and submit Television Inspection Logs providing location of service connections along with the location of any discrepancies.

Keep computer printed location records (Television Inspection Logs) and clearly show the location and orientation in relation to an adjacent manhole for each point observed during the TV inspection. Record features of significance such as locations and orientations of service connections, pipe deflections, leaks, rolled or dislodged gaskets, sags or bellies in the line, or wide joints.

Document noted defects and lateral connections as color digital files and color hard copy prints. Photo logs must accompany each photo submitted.

Prior to submission of the TV inspection video, Television Inspection Logs, and digital photographs to the Contracting Officer, review the submittal items to ensure compliance with the quality criteria set forth in this specification. Provide a copy of such video along with the Television Inspection Logs and Digital photographs to the Contracting Officer within five business days of completion of the video-inspection. In the event that the video, Television Inspection Logs or digital photographs are deemed of poor quality or substandard by the Contracting Officer, the videos, Television Logs, or digital photographs will be returned and a re-inspection provided by the Contractor, at no additional cost to the Government.

G30 1.3.5.4 Sanitary Sewer Manholes Verification Testing

Provide a visual inspection of manholes for proper grade and water tightness. Provide testing on sanitary sewer manholes in accordance with state regulations. At minimum, perform hydraulic testing in accordance with ASTM C 969/C 969M.

G30 1.3.5.5 Wastewater Pump Station Verification Testing

Test the wastewater pump station in accordance with state regulations. Conduct testing on discharge piping and force main in accordance with tests for water distribution mains; see G30, paragraph 1.3.2. Test pumps, controls, and alarms, in operation, under design conditions to ensure proper operation of equipment.

G30 1.3.6 Storm Sewer System Verification Testing

G30 1.3.6.1 Deflection Test

Deflection of pipe in the installed pipeline under external loads must not exceed 4.5 percent of the average inside diameter of pipe, in accordance with ASTM D 2412.

G30 1.3.6.2 TV Inspection for Storm Sewer Under Pavements

Complete the post-installation TV inspection to confirm that the completed lines are free of defects. For video recordings include an audio track recorded by the inspection technician during the actual inspection work describing the parameters of the line being inspected. The minimum information to be included is the pipe material, pipe size, starting and stopping manholes and descriptions of any features as they occur. Video recording playback must be at the same speed that it was recorded. Permanently label CDs / DVDs according to their contents; CDs / DVDs become the property of the Government.

Provide TV inspections of storm sewer lines in accordance with the Pipeline Assessment and Certification Program as sponsored by the National Association of Sewer Service Companies (NASSCO). Prior to initiating CCTV inspection, provide copies of PACP Certification of the operators that perform the work.

Complete pipe segments and manhole work, including pipe penetrations, manhole benches, main line and manhole visual inspection, pressure testing, and deflection test on a section of line (manhole to manhole) prior to performing TV.

Complete post-installation TV inspection in the presence of the Contracting Officer or designated representative.

The importance of accurate measurements is emphasized. The meter device must be accurate to one tenth of a foot.

Utilize the full capabilities of the camera equipment to document the completion and the conformance of the work to the Contract Documents. Provide a full 360 degree view of the pipe, joints and service connections. Move the camera through the line in either direction at a moderate rate, stopping to permit proper documentation of the sewer's condition. The maximum speed must be no greater than 30 feet per minute. Use manual wenches, power winches, TV cable and powered rewinds or other devices that do not obstruct the camera view or interfere with the proper documentation of the sewer conditions to move the camera through the sewer line.

Once video recording has commenced, the recording must be continuous, without interruption, until the termination manhole is reached.

Provide a color video showing the completed work. Prepare and submit Television Inspection Logs providing location of service connections along with the location of any discrepancies.

Keep computer printed location records (Television

Inspection Logs) and clearly show the location and orientation in relation to an adjacent manhole for each point observed during the TV inspection. Record features of significance such as locations and orientations of service connections, pipe deflections, leaks, rolled or dislodged gaskets, sags or bellies in the line, or wide joints.

Document noted defects and lateral connections as color digital files and color hard copy prints. Photo logs must accompany each photo submitted.

Prior to submission of the TV inspection video, Television Inspection Logs, and digital photographs to the Contracting Officer, review the submittal items to ensure compliance with the quality criteria set forth in this specification. Provide a copy of such video along with the Television Inspection Logs and Digital photographs to the Contracting Officer within five business days of completion of the video -inspection. In the event that the video, Television Inspection Logs or digital photographs are deemed of poor quality or substandard by the Contracting Officer, the videos, Television Logs, or digital photographs will be returned and a re-inspection provided by the Contractor, at no additional cost to the Government.

G30 1.3.9 Liquid Fuel Distribution Piping Verification Testing

Acceptance standards must be in accordance with ASME B31.3 paragraph 341.3.2, Chapter VI.

G30 1.4 DESIGN SUBMITTALS

Submit design submittals in accordance with Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, UFC 3-201-01, *Civil Engineering*, and UFC 3-401-01, *Mechanical Engineering*.

Provide sustainability submittals in accordance with Part 2 UFGS Section 01 33 29, *Sustainability Requirements and Reporting*.

G30 1.5 CONSTRUCTION SUBMITTALS

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

Test reports.

Provide sustainability submittals in accordance with Part 2 UFGS Section 01 33 29, *Sustainability Requirements and Reporting*.

G30 1.6 COORDINATION

To the extent that site work is indicated on the RFP drawings, verify

that the locations and inverts of site utility lines are coordinated with building utility lines. Make adjustments to the locations and inverts indicated on the RFP drawings in accordance with codes and standards.

G30 1.7 ANTITERRORISM (AT) STANDARDS

Incorporate the minimum AT standards indicated in UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*.

G30 1.8 BACKFLOW PREVENTION

Submit backflow prevention training certificates and backflow preventer devices certification in accordance with Part 2 UFGS Section 01 50 00, *Temporary Construction Facilities and Controls*.

G30 1.9 WATER STORAGE TANK

Submit a certificate signed by a registered professional engineer providing a (1) description of the entire tank and foundation structural design loading conditions; (2) description of structural design methods and codes used in establishing allowable stresses and safety factors; (3) statement that the structural design has been checked by experienced engineers specializing in hydraulic structures to ensure that design calculations for member sizes, dimensions and fabrication processes are as prescribed by ACI and AWWA standards; and (4) certification that the completed work was inspected in accordance with AWWA D100 or AWWA D103.

G30 1.10 NACE CERTIFIED CATHODIC PROTECTION SPECIALIST QUALIFICATIONS

Submit qualifications of specialist prior to site welding. Submit documentation of current NACE certification.

G30 1.11 EXCAVATION, BACKFILLING AND COMPACTION OF UTILITIES

Refer to Section G10, *Site Preparation*.

G30 1.12 DELIVERY, STORAGE AND HANDLING OF MATERIALS

Inspect materials delivered to site for damage. Unload and store with minimum handling. Store materials on site in enclosures or under protective covering. Store plastic piping, jointing materials and rubber gaskets under cover out of direct sunlight. Do not store materials directly on the ground. Keep inside of pipes, fittings, valves, and hydrants free of dirt and debris. Handle in a manner to ensure delivery to the trench in sound undamaged condition. Take special care to avoid injury to coatings and linings on pipe and fittings; make satisfactory repairs if coatings or linings are damaged. Carry, do not drag pipe to the trench.

G3010 WATER SUPPLY

G3010 1.1 WATER SYSTEM DESIGN

Determine domestic and fire demands for the facility and verify the

design of all components of the domestic and fire protection supply systems. Design and construct the water system in accordance with UFC 3-230-01, *Water Storage, Distribution, and Transmission;* the state waterworks' regulations, and the utility provider's requirements. Design the water supply systems to provide required flows and maintain residual pressures based upon peak demands.

If the new water system is an extension of an existing water system, obtain static pressure, residual pressure and flow characteristics of the existing distribution system by actual field tests. Conduct flow and pressure tests and provide design calculations that show the existing lines are capable of handling the additional flows. Connect the new water system to the nearest existing fitting or water line capable of handling the additional flows.

Design the connections to the water system including the meter assemblies and backflow-preventing devices in accordance with the requirements of the Activity or utility provider and the state waterworks regulations.

Wherever possible, locate valve boxes and other utility access structures out of paved areas.

G301001 WELL SYSTEMS

Design and construct the potable water well system in accordance with AWWA A100 and its appendices; the state waterworks' regulations, and the system owner's preferences and requirements.

G301001 1.1 WATER METER

Provide a water meter on the well pump discharge piping aboveground in a pump enclosure or in a meter vault underground. Provide type of water meter and remote reading capability in accordance with system owner's preferences and requirements: AWWA C700, displacement type; AWWA C701, turbine type; or AWWA C702, compound type.

G301001 1.2 TEST HOLE

Drill test hole(s) at the well site before construction of the permanent well to determine the existing site-specific geologic and hydrologic conditions and groundwater-quality parameters. A test hole may be incorporated into the finished construction provided it meets the requirements for a finished well. Seal test holes not used in finished construction as recommended in accordance with AWWA C654 and the state waterworks' regulations. Upon completion of test hole, provide recommendations for permanent wells and submit data obtained at each well site. Include with the recommendations the appropriate depth, details of construction, length and location of screens, screen openings, gravel size, grout, and an estimation of the quantity of water that can be obtained from each water-bearing stratum and from each completed well. Submit electric log, a drillers log drawn to scale with coarseness and fineness modulus of each strata, time penetration log (time to drill through each formation), and sieve analysis to substantiate recommendations.

G301001 1.3 WELL CONSTRUCTION

G301001 1.3.1 Well Development

Provide well development in accordance with AWWA A100 and the state waterworks' regulations.

G301001 1.3.2 Disinfection

Disinfect well, equipment, and material in accordance with AWWA C654 and the state waterworks' regulations. Provide a sanitary seal for the well to prevent contamination until the pump foundation and pump are installed on the well.

G301001 1.4 ABANDONMENT OF EXISTING WELLS

Abandon and seal existing wells in accordance with AWWA A100 and the state waterworks' regulations.

G301002 POTABLE WATER DISTRIBUTION

G301002 1.1 WATER SYSTEM DESIGN

Provide materials, equipment, labor, testing, and miscellaneous related items for water distribution mains and service lines to the facility and connections to the existing water system in accordance with UFC 3-230-01, *Water Storage, Distribution, and Transmission*; the utility provider's requirements; and the state waterworks' regulations; whichever is more stringent.

Determine available flow at the residual pressure at each point of connection by conducting flow tests in accordance with AWWA M17 and NFPA 291.

Provide water main piping, service lines, fittings, valves, accessories and other materials in compliance with the American Water Works Association (AWWA) standards for a minimum system working pressure of 150 psi (1050 kPa).

G301002 1.2 WATER DISTRIBUTION MAINS

For underground applications, utilize ductile iron or PVC piping for water mains 12 inches (300 mm) in diameter and less. Utilize ductile iron piping for water mains deeper than 10 feet (3.0 m) or larger than 12 inches (300 mm) in diameter.

For aboveground applications, utilize flanged ductile iron pipe for water mains.

G301002 1.2.1 Materials

a. Ductile Iron Pressure Pipe

1) Pipe: AWWA C151, Pressure Class 350.

2) Fittings: AWWA C110 or AWWA C153.

3) Interior Lining: AWWA C104.

4) Exterior Protection (if required): AWWA C105, polyethylene encasement.

b. PVC Pressure Pipe

1) Pipe: AWWA C900, Pressure Class 150.

2) Fittings: Ductile Iron (AWWA C110 or AWWA C153).

c. Flanged Ductile Iron Pipe

1) Pipe: AWWA C115 and its appendices.

2) Fittings: AWWA C110 or AWWA C153.

3) Lining: AWWA C104.

G301002 1.2.2 Installation

a. Ductile Iron: AWWA C600.
b. PVC: AWWA C605.

Provide nondetectable warning tape and a continuous length of tracer wire for the full length of each run of nonmetallic piping below grade. Warning tape to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording. Color to be blue for potable water systems and purple for nonpotable, reclaimed water, and irrigation lines. Terminate tracer wire above grade at valve boxes and at exterior of building.

G301002 1.2.3 Connections to Existing Water Lines

Make connections to existing water lines after approval from the system owner is obtained and with a minimum interruption of service on the existing line. Make connections to existing lines under pressure in accordance with the recommended procedures of the manufacturer of the pipe being tapped.

G301002 1.3 WATER SERVICE LINES

Utilize copper tubing or PVC piping for water service lines less than 4 inches (100 mm) in diameter.& Utilize ductile iron pipe or PVC pressure pipe for water service lines 4 inches (100 mm) and 6 inches (150 mm) in diameter; see G301002, paragraph 1.2, "Water Distribution Mains" for additional requirements for ductile iron and PVC piping.

G301002 1.3.1 Materials

a. Copper Tubing

1) Pipe: ASTM B 88/B 88M, Type K.

2) Fittings for Solder-Type Joint: ANSI B16.8 or ASME B16.22.

3) Fittings for Compression-Type Joint: ASME B16.26, flared tube type.

b. PVC Pressure Pipe

1) Pipe: ASTM D1785, Schedule 40 or ASTM D 2241, with SDR rating for 160 psi (1.1 MPa) pressure rating.

2) Fittings: ASTM D 2466.

3) Joints: Elastomeric gaskets for pressure rating; solvent cement joints, ASTM D 2564.

G301002 1.3.2 Service Connections

Connect service lines 2-inch (50 mm) diameter or less to the main by a corporation stop and install a gate valve on service line below the frostline.

a. Ductile-iron water mains: AWWA C600.
b. PVC water mains: UBPPA UNI-PUB-8 and the recommendations of AWWA M23, Chapter 9, "Service Connections."

G301002 1.3.3 Installation

Install pipe, fittings and accessories in accordance with manufacturer's instructions.

a. Metallic Piping: in accordance with requirements of AWWA C600.
b. PVC: ASTM D 2774 and ASTM D 2855.

G301002 1.4 CORROSION PROTECTION

G301002 1.4.1 Insulating Joints

Provide insulating joints to prevent contact between dissimilar metals at the joint between adjacent sections of piping in accordance with the pipe manufacturer's recommendations. Ensure that there is no metal-to-metal contact between dissimilar metals after the joint has been assembled.

To prevent the possibility of bi-metallic corrosion, wrap service lines of dissimilar metal to the water mains and the attendant corporation stops with polyethylene or dielectric tape for a minimum clear distance of 3 feet (900 mm) from the main.

G301002 1.5 VALVES

Install valves with the same diameter and have the same joint ends as the mains to which they are installed. Provide each type of valve from one manufacturer.

G301002 1.5.1 Gate Valves

G301002 1.5.1.1 Location

Install valves at new points of connection. At a minimum, locate valves to ensure that no more than two fire hydrants will be out of service in the event of a single break in a water main. Locate valves outside of pavement and heavy traffic areas whenever possible.

G301002 1.5.1.2 Gate Valves 3-inch (75 mm) and Larger in Diameter

a. Valves (20-inch and smaller in diameter): AWWA C509 or AWWA C515, nonrising stem and of one manufacturer.
b. Valves (greater than 20-inch in diameter): AWWA C500.
c. Valves for Indicator Post: AWWA C509 or AWWA C500, as indicated above, with indicator post flange in accordance with requirements of UL 262.
d. Interior Coating: AWWA C550.

G301002 1.5.1.3 Gate Valves Smaller than 3-inch (75 mm) in Diameter

MSS SP-80, Class 150, solid wedge. Provide valves with flanged or threaded end connections, with unions on both sides of the valve and a handwheel operator.

G301002 1.5.1.4 Valve Box

Provide a cast iron, adjustable, valve box for each gate valve on buried piping. Provide valve boxes of a size suitable for the valve on which it is to be used with a minimum diameter of 5-1/4 inches (130 mm). Provide a round head and cast the word "WATER" on the lid.

G301002 1.5.2 Check Valves

Provide check valves sized 2-inches (50 mm) to 24-inches (600 mm) as swing-check type (AWWA C508) and with a protective epoxy interior coating conforming to AWWA C550. For underground applications, provide check valve in a valve vault.

G301002 1.5.3 Air Release, Air/Vacuum, and Combination Air Valves

AWWA C512 and AWWA M51.

G301002 1.5.4 Corporation Stops

If service lines 2—inch diameter or less are tapping water mains, provide corporation stops. Provide ground key type, bronze corporation stops, ASTM B61 or ASTM B62.

G301002 1.5.5 Installation of Valves

Make and assemble joints to valves as specified for making and

assembling the same type of joints between pipe and fittings.

G301002 1.6 WATER METERS

Provide water meter and remote reading as required by the utility provider and in accordance with AWWA standards.

G301002 1.7 BACKFLOW PREVENTION

Provide backflow prevention and cross connection control in accordance with AWWA M-14 and governing local/state plumbing codes and waterworks' regulations.

G301002 1.8 FIRE HYDRANTS

Provide fire hydrants from one manufacturer and in accordance with UFC 3-600-01, *Fire Protection Engineering*. Coordinate with the project's fire protection designer of record. Provide protection for fire hydrants located in areas subject to vehicle damage. Provide fire hydrants with National Standard threads on hose and pumper connections. Provide a 6 inch (150 mm) inlet, two 2.5 inch (62 mm) hose connections and one pumper connection sized to accommodate local fire department equipment requirements. Paint hydrants with at least one coat of primer and two coats of enamel paint. Barrel and bonnet colors must be in accordance with UFC 3-600-01. Stencil hydrant number and main size on the hydrant barrel using black stencil paint.

a. Dry Barrel Fire Hydrants: AWWA C502 with frangible sections.
b. Wet Barrel Fire Hydrants: AWWA C503 or UL 246, "Wet Barrel" design, with breakable features.
c. Installation: Install hydrants with the pumper connection facing the adjacent paved surface. If there are two, paved adjacent surfaces, contact the Contracting Officer for further direction.

G301002 1.9 THRUST RESTRAINT

Provide thrust restraint for all piping, valves, fittings, and other appurtenances of the water distribution system.

Provide thrust restraint using restrained joints in accordance with pipe manufacturer's recommendations, AWWA C600 and if for fire service main, NFPA 24.

G301002 1.10 DISINFECTION

Disinfect new water piping and existing water piping affected by Contractor's operations in accordance with the state waterworks' regulations and AWWA C651.

G301003 POTABLE WATER STORAGE

G301003 1.1 POTABLE WATER STORAGE TANKS

Provide potable water storage facilities in accordance with UFC 3-230-01, *Water Storage, Distribution, and Transmission;* and the state waterworks' regulations.

An elevated, steel water storage tank must be in accordance with AWWA D100. A ground, steel water storage tank must be in accordance with AWWA D100 for welded tanks and AWWA D103 for bolted tanks.

G301003 1.2 TANK ACCESSORIES

Provide piping and valves in accordance with G301002. Install an altitude valve in a valve vault with appropriate shut off valves and check valve.

G301003 1.3 TANK COATINGS

Utilize primer, intermediate coat and topcoat materials from one manufacturer. Secondary materials, produced or specifically recommended by the coating system manufacturer, may be used. Contrasting colors between coats are required.

G301003 1.3.1 Interior Coating System

Provide a commercially available interior coating system that is certified in accordance with AWWA D102, ICS-No. 2 or ICS-No. 5, and with NSF 61 and is in accordance with the state waterworks' regulations.

The color of the final coat must be approved in writing by the Contracting Officer before application begins.

Apply coatings at the following specified thickness:

Coat	Minimum DFT (mils)	Maximum DFT (mils)
Primer	3	5
Intermediate	3	5
Top	3	5
Total Systems	9	15

G301003 1.3.2 Exterior Coating System

Provide a commercially available, zinc/epoxy/polyurethane exterior coating system that is certified in accordance with AWWA D102, OCS-No. 6 and is in accordance with the state waterworks' regulations.

The color of the final coat must be approved in writing by the Contracting Officer before application begins.

Apply coatings at the following specified thickness:

Coat	Minimum DFT (mils)	Maximum DFT (mils)

Primer	3	5
Intermediate	3	5
Top	2	3
Total Systems	8	13

G301004 FIRE PROTECTION WATER DISTRIBUTION

G301004 1.1 GENERAL REQUIREMENTS

Refer to portions of Section G301002 and Section D40, *Fire Protection*. Provide water main piping, service lines, fittings, valves, accessories and other materials in compliance with the American Water Works Association (AWWA) standards for a minimum system working pressure of 200 psi (1380 kPa).

G301004 1.2 DETECTOR CHECKS

UL 312; detector check includes bypass meter, piping, gate valves, check valve and connections to detector check valve. Set valve to allow minimal water flow through bypass meter when major water flow is required.

G301004 1.3 FIRE DEPARTMENT CONNECTIONS

UL 405.

G301004 1.4 INDICATOR POSTS

UL 789.

G301005 FIRE PROTECTION WATER STORAGE

Design and construct Fire Protection Water Storage systems in accordance with UFC 3-600-01 and NFPA 22.

G301006 NON-POTABLE WATER DISTRIBUTION

Refer to G301002; note that system disinfection is not required.

G301007 PUMPING STATIONS

If a pump station is allowed, provide a packaged booster pump station including pumps, piping, valves, sensors, controls, and accessories to maintain the water system pressure in accordance with UFC 3-230-01, *Water Storage, Distribution, and Transmission;* and the state waterworks' regulations.

The packaged booster pump station must have an Underwriter’s Laboratories (UL) label indicating compliance of the equipment under the packaged pumping

systems UL listing category. This label must be inclusive of the entire station with enclosure so as to demonstrate compliance with the National Electrical Code requirements for working clearances and wiring procedures.

Interior coatings of pumps, piping, valves and other accessories must be a National Standard Foundation (NSF) Standard 61 certified material for potable water.

G301008 PACKAGED WATER TREATMENT PLANTS

Provide packaged water treatment plants in accordance with UFC 3-230-03, *Water Treatment;* for pipeline materials and the state waterworks' regulations for treatment plant requirements.

G3020 SANITARY SEWER

G3020 1.1 GENERAL REQUIREMENTS

Design and construct the gravity sanitary sewage collection system in accordance with UFC 3-240-01, *Wastewater Collection;* and the state sewer collection and treatment regulations. Connect the new sanitary sewage collection system to the nearest existing sanitary manholes or sanitary line adjacent to the project site. Provide design calculations that show the existing system is capable of handling the additional flows.

In areas where chemicals and other substances may be stored (including mechanical and electrical rooms), eliminate floor drains or make provisions to prevent spills from entering the sanitary sewer system. If there is process flow from equipment, discharge can be hard piped, with air gap, to the sanitary sewer.

Wherever possible, locate manholes and other utility access structures out of paved areas.

G302001 SANITARY SEWER PIPING

G302001 1.1 GENERAL REQUIREMENTS

Provide materials, equipment, labor, testing, and miscellaneous related items to provide sanitary sewage lines for collection and services from the buildings.

G302001 1.2 GRAVITY SEWER PIPING

For gravity sanitary sewer mains and laterals, utilize Ductile Iron, PVC or Polypropylene sewer pipe and fittings. Use Ductile Iron under roadways or at depths greater than 10 feet (3.0 m). PVC and Polypropylene may only be used under roadways or at depths greater than 10 feet (3.0 m) when written approval is received by the Government's Civil Reviewer or indicated in another part of the RFP.

G302001 1.2.1 Materials

a. PVC Gravity Sewer Pipe

1) Piping and Fittings: ASTM D3034 or ASTM F679, SDR 35.

2) Joints: ASTM D3212 and ASTM F477.

b. Ductile Iron Gravity Sewer Pipe

1) Piping: ASTM A746. Provide required Thickness Class based on design information and methods in ASTM A746.

2) Fittings: AWWA C110 or AWWA C153.

3) Joints: AWWA C111.

4) Interior Coating: AWWA C104.

5) Exterior Protection (if required): AWWA C105, polyethylene encasement.

c. Dual Wall and Triple Wall Polypropylene Sewer Pipe 12 inches to 60 inches

1) Piping and Fittings: ASTM F2736 and ASTMF2764/F2764M.

2) Joints: ASTM D3212 and ASTM F477.

G302001 1.2.2 Connections to Existing Lines

Obtain approval from the Contracting Officer before making a connection to an existing line. Conduct work so that there is minimum interruption of service on existing line and provide a new manhole at the connection point.

G302001 1.2.3 Installation

Install pipe, fittings and accessories in accordance with manufacturer's instructions.

a. PVC and Dual and Triple Wall Polypropylene: ASTM D2321. Do not use ASTM D2321 Class IV or V materials for bedding, haunching or initial backfill materials.

b. Ductile Iron: AWWA C600.

Provide nondetectable warning tape and a continuous length of tracer wire for the full length of each run of nonmetallic piping below grade. Warning tape to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording. Color to be green for sewer systems. Terminate tracer wire above grade at valve boxes and at exterior of building.

G302001 1.3 PIPING FOR CLEANOUTS

G302001 1.3.1 Materials

a. Cast-Iron Soil Pipe for Cleanouts

1) Pipe: ASTM A 74, service.

2) Joints: ASTM C 564 compression-type rubber gaskets.

3) Exterior Protection (if required): AWWA C105, polyethylene encasement.

G302001 1.3.2 Installation

Install cast iron pipe and fittings in accordance with the recommendations of the pipe manufacturer.

G302002 SANITARY SEWER MANHOLES & CLEANOUTS

G302002 1.1 GENERAL REQUIREMENTS

Provide materials, equipment, labor, testing, and miscellaneous related items for the sanitary manholes in accordance with the following:

a. Set manhole rim elevations flush with finished surface of paved areas or 1 inch (25 mm) above finished grade in unpaved areas.
b. ASTM C 923/C923M resilient connectors for making joints between manhole and pipes entering manhole.
c. Provide drop manholes when a gravity sewer pipe enters a manhole at an elevation of 24 inches (610 mm) or more above the manhole invert.

G302002 1.2 PRECAST CONCRETE MANHOLES

ASTM C 478/C 478M; base and first riser must be monolithic.

Precast manhole sections must have:

a. ASTM C 990/C 990M butyl gaskets;
b. ASTM C 443/C 443M rubber O-ring joints; or
c. ASTM C 443, Type B gaskets.

G302002 1.3 CAST-IN-PLACE CONCRETE MANHOLES

Reinforced concrete; designed according to ASTM C 890 for A-16 (AASHTO HS20-44), heavy-traffic, structural loading. Provide concrete work in accordance with ACI 301/301M and ACI 350-01; provide a minimum compressive strength of 4000 psi (28 MPa).

G302002 1.4 MANHOLE FRAMES AND COVERS

Frame and cover must be cast gray iron, ASTM A48/A48M, Class 35B, cast ductile iron, ASTM A536, Grade 65-45-12, or reinforced concrete, ASTM C478 ASTM C478M. Provide frame and cover adequate to accommodate the imposed live load. Stamp or cast the words "Sanitary Sewer" into covers so that it is plainly visible.

G302002 1.5 MANHOLE STEPS

a. Zinc-coated steel: 29 CFR 1910.27.
b. Plastic or rubber coating pressure molded to steel: ASTM D 4101,

copolymer polypropylene; or ASTM C 443/C 443M, except shore A durometer hardness must be 70 plus or minus 5.

Aluminum steps or rungs are not allowed.

Steps are not required in manholes less than 4 feet (1.2 m) deep.

G302002 1.6 MANHOLE CONSTRUCTION

Where a new manhole is constructed on an existing line, remove existing pipe to construct the manhole. Cut existing pipe so that pipe ends are approximately flush with the interior face of manhole wall, but not protruding into the manhole. For changes in direction of the sewer and entering branches into the manhole, make a circular curve in the manhole invert of as large a radius as manhole size will permit. For cast-in-place concrete, no parging will be allowed on interior manhole walls.

G302002 1.7 CONNECTIONS TO EXISTING MANHOLES

Center pipe connections to existing manholes on the manhole. Holes for the new pipe must be of sufficient diameter to allow packing cement mortar around the entire periphery of the pipe but no larger than 1.5 times the diameter of the pipe. Cut the manhole in a manner that causes the least damage to the walls.

G302002 1.8 CLEANOUTS

Construct cleanouts of cast iron soil pipe and fittings; see G302001, paragraph 1.3.

G302003 LIFT STATIONS AND PUMPING STATIONS

G302003 1.1 GENERAL REQUIREMENTS

If a pump station is allowed, provide materials, equipment, labor, testing and miscellaneous related items for a packaged lift or pump station system for the facility in compliance with the UFC 3-240-01, *Wastewater Collection*; the state sewerage regulations; and the utility provider's requirements.

G302003 1.2 SUBMERSIBLE PUMPS

Provide pumps capable of handling raw wastewater and passing spheres of at least 3 inches (75 mm) in diameter. The pump's suction and discharge openings must be at least 4 inches (100 mm) in diameter.

Provide submersible sewage pumps, with guide rail system. Include ASTM A48/A48M, Class 25, nonclog, cast-iron impeller; and hermetically sealed motor with moisture-sensing probe, mechanical seals, and waterproof power cable. Construct the guide rail system of stainless steel. Provide a stainless steel lifting chain for raising and lowering the pump in the basin.

G302003 1.3 GRINDER PUMPS

Provide grinder-type sewage pumps, with guide rail system. Include stainless steel or bronze impeller and hermetically sealed motor with moisture-sensing probe, mechanical seals, and waterproof power cable. Construct the guide rail system of stainless steel. Provide a stainless steel lifting chain for raising and lowering the pump in the basin.

G302003 1.4 SUCTION LIFT PUMPS

Provide pumps capable of handling raw wastewater and passing spheres of at least 3 inches (75 mm) in diameter. The pump's suction and discharge openings must be at least 4 inches (100 mm) in diameter.

Provide dry-chamber-mounting, vacuum-primed, nonclog sewage pumps located in dry compartment above wet pit. Include ASTM A48/A48M, Class 25, nonclog, cast iron impeller; mechanical or stuffing box seals; pedestal mounted motor; and suction piping extending to bottom of wet pit.

Provide suction-lift pumps capable of automatic rapid self priming and re-priming at the "lead pump on" elevation. Suction piping must not exceed 25 feet (7.6 meters) in total length. Priming lift at the "lead pump on" elevation must include a safety factor of at least 4 feet (1.2 meters) from the maximum allowable priming lift for the specific equipment at design operating conditions. The combined total of dynamic suction-lift at the "pump off" elevation and the required net positive suction head at design operating conditions must not exceed 22 feet (6.7 meters).

G302003 1.5 PUMP MOTOR

Provide pump motor sized to accommodate pump operation along the entire impeller curve.

G302003 1.6 STATION PIPING WITHIN WET WELL AND VALVE VAULT

G302003 1.6.1 Piping Less than 4-Inch (100 mm) in Diameter

a. PVC Pressure Pipe

1) Pipe: ASTM D 1785, Schedule 80.

2) Fittings: Schedule 80 socket fittings, ASTM D 2467; Schedule 80 threaded fittings, ASTM D 2464.

G302003 1.6.2 Piping 4 inch (100 mm) Diameter and Larger

a. Flanged Ductile Iron Pipe

1) Pipe: AWWA C115 and its appendices.

2) Fittings: AWWA C110 or AWWA C153.

3) Lining: AWWA C104.

G302003 1.7 FORCE MAINS

G302003 1.7.1 Force Mains for Submersible and Suction Lift Pumps

Force mains must be at least 4 inches (100 mm) in diameter and be constructed of either ductile iron or PVC pressure pipe.

a. Ductile Iron Pressure Pipe

1) Pipe: AWWA C151, Pressure Class 350.

2) Fittings: AWWA C110 or AWWA C153.

3) Interior Lining: AWWA C104.

4) Exterior Protection (if required): AWWA C105, polyethylene encasement.

b. PVC Pressure Pipe

1) Pipe: AWWA C900, Pressure Class 150. AWWA C905.

2) Fittings: Ductile Iron (AWWA C110 or AWWA C153).

G302003 1.7.2 Force Mains for Grinder Pumps

Utilize PVC pressure pipe for force mains less than 4 inches (100 mm) in diameter :

a. PVC Pressure Pipe

1) Pipe: ASTM D 1785, Schedule 40 or ASTM D 2241, with SDR rating for 160 psi (1.1 MPa) pressure rating.

2) Fittings: ASTM D 2466.

3) Joints: Elastomeric gaskets for pressure rating; solvent cement joints, ASTM D 2564.

G302003 1.8 PIPING ACCESSORIES

G302003 1.8.1 Insulating Joints

Provide between pipes of dissimilar metals a rubber gasket or other approved insulating joint or dielectric coupling to effectively prevent metal-to-metal contact between adjacent sections of piping.

G302003 1.8.2 Accessories

Provide flanges, connecting pieces, transition glands, transition sleeves, and other adapters as required.

G302003 1.8.3 Flexible Flanged Coupling

Provide flexible flanged coupling for sewage as indicated. Use flexible flanged coupling designed for a working pressure of 350 psi (2400 kPa).

G302003 1.9 VALVES

Provide shutoff and check valves on the discharge line of each pump. Locate the check valve between the shutoff valve and the pump. Locate valves in accordance with state sewerage regulations. Check valves must be suitable for the material being handled and placed on the horizontal portion of the discharge piping except for ball check valves, which may be placed in the vertical run. Provide valves capable of withstanding normal pressure and water hammer. Use valves from one manufacturer.

G302003 1.9.1 Shut Off Valves

G302003 1.9.1.1 Shut Off Valves Less than 4 Inch (100 mm) in Diameter

PVC ball valves.

G302003 1.9.1.2 Shut Off Valves 4 Inch (100 mm) and Larger in Diameter

AWWA C509 or AWWA C515, nonrising stem, and flanged. Provide valves with handwheels that open by counterclockwise rotation of the valve stem. Provide epoxy coating in accordance with AWWA C550.

G302003 1.9.2 Check Valves

G302003 1.9.2.1 Check Valves Less than 4-Inch (100 mm) in Diameter

Neoprene ball check valve with integral hydraulic sealing flange, designed for a hydraulic working pressure of 175 psi (1200 kPa).

G302003 1.9.2.2 Check Valves 4-Inch (100 mm) and Larger in Diameter

AWWA C508, flanged. Provide a nonclog, swing check valve rated for not less than 175 psig (1200 kPa) working pressure capable of passing 3-inch (75 mm) diameter solids.

G302003 1.9.3 Air Relief Valves

Provide air relief valves at high points in the force main to prevent air locking in accordance with AWWA M51. Provide vacuum relief valves to relieve negative pressures on force mains.

G302003 1.10 IDENTIFICATION TAGS AND PLATES

Provide valves with tags or plates numbered and stamped for their usage. Use plates and tags of brass or nonferrous material and mounted or attached to the valve.

G302003 1.11 THRUST RESTRAINT

Provide thrust restraint for force mains, valves and other features of the wastewater distribution system.

Provide thrust restraint using restrained joints in accordance with pipe manufacturer's recommendations, AWWA C600 and if for fire service main, NFPA 24.

G302003 1.12 STATION CONTROL SYSTEM

G302003 1.12.1 Operating Controls

G302003 1.12.2 Alarm Controls

Provide alarms for pumping and lift stations; at minimum provide alarms for high level, power failure, pump failure, unauthorized entry or any cause of station malfunction. Provide alarms as required by the pump manufacturer to obtain warranty.

G302003 1.12.3 Telemetry

If required, provide a telemetry system in accordance with state sewer collection and treatment regulations and system owner's requirements to relay alarms to a facility that is manned 24 hours a day.

G302003 1.13 UNDERGROUND ENCLOSURES

G302003 1.14 STATION ACCESSORIES

G302003 1.14.1 Ventilation

Provide covered wet wells with provisions for air displacement venting to the outside. Provide galvanized ASTM A 53/A 53M pipe with insect screening.

Provide adequate ventilation for pump stations.

G302003 1.14.2 Metering

Provide devices for measuring wastewater flow at pumping stations. Provide indicating, totalizing and recording flow measurement at pumping stations with a 1200 gpm (76 l/s) or greater design peak hourly flow. For smaller stations, provide elapsed time meters in conjunction with pumping rate tests.

G302003 1.14.3 Pipe and Valve Supports

Use schedule 40 galvanized steel piping conforming to ASTM A 53/A 53M for pipe and valve supports. Provide either ANSI B16.3 or ANSI B16.11 galvanized threaded fittings.

G302003 1.14.4 Miscellaneous Metals

Use stainless steel bolts, nuts, washers, anchors, and supports for installation of equipment.

G302004 PACKAGED SANITARY SEWER TREATMENT PLANTS

Provide packaged wastewater treatment facilities in accordance with UFC 3-240-02, *Domestic Wastewater Treatment;* for pipeline materials and the state sewer collection and treatment regulations for treatment plant requirements.

G302005 SEPTIC TANKS

Provide septic tanks in accordance with the state and treatment regulations and the International Private Sewage Disposal Code 2000.

G302006 DRAIN FIELDS

Provide drain fields in accordance with the state and treatment regulations and the International Private Sewage Disposal Code 2000.

G302090 OTHER SANITARY SEWER

G302090 1.1 OIL INTERCEPTOR

Refer to G303090.

G3030 STORM SEWER

Provide materials, equipment, labor, testing, and miscellaneous related items to provide storm drainage collection system to drain the site. Design and construct the storm sewer collection system in accordance with UFC 3-201-01, *Civil Engineering*; the utility provider's requirements; and the state stormwater management laws and regulations. Design project site to prevent stormwater runoff in excess of the capacity of the existing utility system.

G303001 STORM SEWER PIPING

G303001 1.1 PIPING

Storm sewer piping 12 inches (300 mm) and larger in diameter must be reinforced concrete, ductile iron or corrugated steel; PVC, corrugated aluminum, polyethylene and polypropylene pipe may only be used when written approval is received by the Government's Civil Reviewer or indicated in another part of the RFP.

Utilize perforated PVC or HDPE for subsurface drainage piping.

G303001 1.1.1 Materials

a. PVC Pipe

1) Piping and Fittings: ASTM D3034, SDR 35.

2) Joints: ASTM D3212 and ASTM F477.

b. Ductile Iron Pipe

1) Piping: ASTM A746. Provide required Thickness Class based on design information and methods in ASTM A746.

2) Fittings: AWWA C110 or AWWA C153.

3) Joints: AWWA C111.

4) Interior Coating: AWWA C104.

5) Exterior Protection (if required): AWWA C105, polyethylene encasement.

c. Reinforced Concrete Pipe

1) Circular Pipe: ASTM C76/C76M. Provide required Class based on design information and methods in ASTM C76/C76M. Class III minimum.

2) Elliptical Pipe: ASTM C507/C507M. Provide required Class based on design information and methods in ASTM C76/C76M.

3) Joints:

a) ASTM C990/C990M butyl gaskets;

b) ASTM C 443/C 443M rubber O-ring joints; or

c) AASHTO M 198, Type B preformed plastic gaskets.

d. Corrugated Aluminum Pipe

1) Piping: ASTM B745/B745M.

2) Joints: Coupling bands conforming to ASTM B745/B745M.

3) Coating: Fully bituminous coated in accordance with ASTM A849. For applications where piping is part of a piped storm sewer system (not a culvert), provide pipe fully bituminous coated, invert (half) paved with concrete lining in accordance with ASTM A849.

e. Corrugated Steel Pipe

1) Piping: ASTM A760/A760M.

2) Joints: Coupling bands conforming to ASTM A760/A760M.

3) Coating: Fully bituminous coated in accordance with ASTM A849. For applications where piping is part of a piped storm sewer system (not a culvert), provide pipe fully bituminous coated, invert (half) paved with concrete lining in accordance with ASTM A849.

f. Polyethylene (PE) Pipe

1) Piping 12 inches to 60 inches and Fittings: ASTM 2648/F2648M and AASHTO M 294 Type S, corrugated.

2) Joints: ASTM F477 and ASTM D3212

g. Dual and Triple Wall Polypropylene (PP) Pipe

1) Piping 12 inches to 60 inches and Fittings: ASTM F2736,

ASTM F2764/F2764M, ASTM F2881 and AASHTO M 330 Type S or D

2) Joints: ASTM F477 and ASTM D3212

h. Perforated PVC Pipe: ASTM D 2729.

i. Perforated PE Pipe

1) Piping and Fittings: AASHTO M 294, Type SP, corrugated.

2) Joints: AASHTO M 294, Soiltight.

G303001 1.1.2 Installation

Install piping in accordance with manufacturer's recommendations and the following standards:

1. PVC, PE and Dual and Triple Wall PP: ASTM D 2321. Do not use ASTM D 2321 Class IV or V materials for bedding, haunching or initial backfill materials.
2. Ductile Iron: AWWA C600.
3. Reinforced Concrete: ACPA 01-102 and 01-103.
4. Corrugated Aluminum: ASTM B 788/B 788M.
5. Corrugated Steel: ASTM A 798/A 798M.
6. Perforated PVC and Perforated PE: ASTM D 2321. Do not use ASTM D 2321 Class IV or V materials for bedding, haunching or initial backfill materials.

Provide nondetectable warning tape and a continuous length of tracer wire for the full length of each run of nonmetallic piping below grade. Warning tape to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording. Color to be green for sewer systems. Terminate tracer wire above grade at valve boxes and at exterior of building.

G303001 1.2 PIPING FOR CLEANOUTS

G303001 1.2.1 Materials

a. Cast-Iron Soil Pipe for Cleanouts

1) Pipe: ASTM A 74, service.

2) Joints: ASTM C 564 compression rubber gaskets.

3) Exterior Protection (if required): AWWA C105, polyethylene encasement.

G303001 1.2.2 Installation

Install cast iron pipe and fittings in accordance with the recommendations of the pipe manufacturer.

G303002 STORM SEWER STRUCTURES

G303002 1.1 GENERAL REQUIREMENTS

Provide materials, equipment, labor, testing, and miscellaneous related items for the drainage structures in accordance with the following:

a. Set structure rim elevations flush with finished surface of paved areas or 1 inch (25 mm) above finished grade in unpaved areas.
b. Provide resilient connectors for making joints between manhole and pipes entering manhole in conformance with ASTM C 923/C 923M.
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 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

Frame and cover for gratings must be cast gray iron, ASTM A48/A48M, Class 35B; cast ductile iron, ASTM A536, Grade 65-45-12; or cast aluminum, ASTM B26/B26M, Alloy 356.OT6. Provide frame and cover to accommodate the imposed live loads. Stamp or cast the words "Storm Sewer" 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. Provide covers of rolled steel floor plate having an approved anti-slip surface. Steel frames and covers must 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. Provide covers of the same material as the frames (i.e. ductile iron frame with ductile iron cover, galvanized steel frame with galvanized steel cover). Perform proof loading in accordance with ASTM A 48/A 48M. Physically stamp proof loads 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. Modify the top of the structure to accept the ductile iron structure in lieu of the steel structure indicated. The finished structure must be level and non-rocking, with the top flush with the surrounding pavement.

G303002 1.5 DRAINAGE STRUCTURE STEPS

a. Zinc-coated steel: 29 CFR 1910.27.
b. Plastic or rubber coating pressure molded to steel: ASTM D 4101, copolymer polypropylene; or ASTM C 443/C 443M, except shore A durometer hardness must be 70 plus or minus 5.

Aluminum steps or rungs are not allowed.

Steps are not required in structures less than 4 feet (1.2 m) deep.

G303002 1.6 DRAINAGE STRUCTURE CONSTRUCTION

Where a new structure is constructed on an existing line, remove existing pipe to construct the structure. Cut existing pipe so that pipe ends are approximately flush with the interior face of structure wall, but not protruding into the structure.

G303002 1.7 CONNECTIONS TO EXISTING STRUCTURES

Center pipe connections to existing structures on the structure. Holes for the new pipe must be of sufficient diameter to allow packing cement mortar around the entire periphery of the pipe but no larger than 1.5 times the diameter of the pipe. Cut the structure in a manner that causes the least damage to the walls.

G303002 1.8 CLEANOUTS

Construct cleanouts of cast iron soil pipe and fittings; see G303001, paragraph 1.2.

G303003 LIFT STATIONS

A stormwater pump station(s) will not be allowed.

G303004 CULVERTS

Provide reinforced concrete or corrugated steel piping for culverts 12 inches (300 mm) and larger in diameter; PVC, corrugated aluminum, polyethylene and polypropylene pipe may only be used when written approval is received by the Government's Civil Reviewer or indicated in another part of the RFP. See G303001, paragraphs 1.1.1 and 1.1.2 for material and installation requirements.

Provide flared end sections of the same material as the pipe material.

Provide erosion control in accordance with the State Erosion and Sedimentation Control Standards or EPA guidance where State Standards are unavailable.

G303005 HEADWALLS

Provide cast-in-place concrete headwalls in accordance with the State Highway Specification (SHS) and standards where the project is located.

G303006 EROSION & SEDIMENT CONTROL MEASURES

Refer to Section G103011.

G303007 STORMWATER MANAGEMENT

G303007 1.1 STORMWATER COLLECTION AND STORAGE

Provide permanent stormwater management (i.e., detention and retention ponds, LID and other drainage features) to control stormwater runoff in accordance with UFC 3-201-01, *Civil Engineering*, UFC 3-210-10, *Low Impact Development*, FC 1-300-09N *Navy and Marine Corps Design Procedures*, State and local stormwater management Laws and Regulations and project sustainability goals. Integrate permanent stormwater management features into the site design in accordance with UFC 3-201-01, *Civil Engineering*.

Parking areas, roads, walks, courtyards, training areas and similar site features may not be used to detain or retain stormwater. Manage stormwater within detention or retention ponds and the LID features indicated in Part 3 of this RFP. Prevent upstream and downstream property damage.

G303090 OTHER STORM SEWER

G303090 1.1 OIL INTERCEPTOR

Provide an oil interceptor to remove free oil from oil-in-water mixtures originating from proposed facility operations. Provide grit protection upstream of the oil interceptor.

Provide an oil interceptor utilizing coalescing media and conforming to the guidelines of the American Petroleum Institute (API).

Provide materials or a coating system which protects the interceptor from the oil-in-water mixture, atmosphere, and in-situ soil conditions.

Use an interceptor with a completely removable cover.

G3040 HEATING DISTRIBUTION

G304001 OVERHEAD HOT WATER SYSTEMS

G304001 1.1 PIPING & FITTINGS

Hot water piping must be ASTM A 53, Type E (electric-resistance welded), Grade A or B), or Type S (seamless, Grade A or B); black steel, Weight Class XS (Extra Strong). ASTM A 106, Grade A or B, black steel, Schedule 80 may be used.

G304001 1.2 INSULATION

Mineral fiber, calcium silicate, or cellular glass pipe insulation with aluminum jacket which matches existing or surrounding insulation. Paint jacket to suit Base Architectural Plan. The minimum insulation thickness must be in accordance with the following table:

Table 1 Insulation Thickness for Hot Water Systems

Nominal Pipe Diameter inches (mm)	Mineral Fiber inches (mm)	Calcium Silicate inches (mm)	Cellular Glass inches (mm)
1.00 (25)	1.5 (38)	1.5 (38)	1.5 (38)
1.5 (38)	1.5 (38)	1.5 (38)	1.5 (38)
2.0 (51)	1.5 (38)	1.5 (38)	1.5 (38)
2.5 (64)	1.5 (38)	1.5 (38)	1.5 (38)
3.0 (76)	1.5 (38)	1.5 (38)	1.5 (38)
4.0 (100)	2.0 (51)	2.5 (64)	1.5 (38)
5.0 (125)	2.0 (51)	2.5 (64)	1.5 (38)
6.0 (150)	2.5 (64)	2.5 (64)	1.5 (38)
8.0 (200)	2.5 (64)	2.5 (64)	1.5 (38)
10.0 (250)	2.5 (64)	2.5 (64)	1.5 (38)
12.0 (300)	2.5 (64)	2.5 (64)	1.5 (38)
14.0 (350)	2.5 (64)	2.5 (64)	1.5 (38)
16.0 (400)	2.5 (64)	2.5 (64)	1.5 (38)
18.0 (450)	2.5 (64)	2.5 (64)	1.5 (38)

G304001 1.3 EXPANSION

Compensate for piping expansion by utilizing expansion loops and joints. Provide guided slip or flexible ball expansion joints.

G304001 1.4 SUPPORTS

MSS SP-58 and MSS SP-69, adjustable supports with insulation protection saddles. Provide stainless steel axles for rollers. Provide support poles with guy wires and hardware.

G304002 OVERHEAD STEAM SYSTEMS

G304002 1.1 PIPING & FITTINGS

G304002 1.1.1 Steam Piping

ASTM A 53, Type E (electric-resistance welded, Grade A or B) or Type S (seamless, Grade A or B), black steel. Provide Weight Class STD (Standard) for welding end connections. Provide Weight

Class XS (Extra Strong) for threaded end connections. ASTM A 106, Grade A or B, black steel, Schedule 40 may be used for pipe sizes through 9 inches (250 mm), and minimum pipe wall thickness of 0.35 inches (9.5 mm) for pipe sizes 12 inches (300 mm) and larger for welding end connections. Provide Schedule 80 for threaded end connections.

G304002 1.1.2 Condensate Piping

ASTM A 53, Type E (electric-resistance welded), Grade A or B), or Type S (seamless, Grade A or B); black steel, Weight Class XS (Extra Strong). ASTM A 106, Grade A or B, black steel, Schedule 80 may be used.

G304002 1.2 INSULATION

Fibrous glass, calcium silicate, or cellular glass pipe insulation with aluminum jacket which matches existing or surrounding insulation. Paint jacket to suit Base Architectural Plan. The minimum insulation thickness must be in accordance with the following tables:

Table 1 Insulation Thickness for Steam Systems

Nominal Pipe Diameter inches (mm)	Fibrous Glass inches (mm)	Calcium Silicate inches (mm)	Cellular Glass inches (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 Diameter inches (mm)	**Mineral Fiber inches (mm)**	**Fibrous Glass inches (mm)**
1.00 (25)	2.5 (64)	*
1.5 (38)	2.5 (64)	*
2.0 (51)	2.5 (64)	*
2.5 (64)	2.5 (64)	*
3.0 (76)	3.0 (76)	*
4.0 (100)	3.0 (76)	*
5.0 (125)	3.5 (90)	*
6.0 (150)	3.5 (90)	*
8.0 (200)	3.5 (90)	*
10.0 (250)	3.5 (90)	*
12.0 (300)	3.5 (90)	*
14.0 (350)	3.5 (90)	*
16.0 (400)	3.5 (90)	*
18.0 (450)	3.5 (90)	*

* Fibrous glass pipe insulation having an insulating efficiency not less than that of the specified thickness of mineral fiber may be provided.

G304002 1.3 EXPANSION

Compensate for piping expansion by utilizing expansion loops and joints. Provide guided slip or flexible ball expansion joints.

G304002 1.4 SUPPORTS

MSS SP-58 and MSS SP-69, adjustable supports with insulation protection

saddles. Provide stainless steel axles for rollers. Provide support poles with guy wires and hardware.

G304003 UNDERGROUND HOT WATER SYSTEMS

G304003 1.1 PIPING & FITTINGS

Direct buried, factory pre-fabricated, pre-insulated, piping systems must consist of a service pipe with polyurethane insulation and a high-density polyethylene (HDPE) jacket. Provide factory fabricated fittings and components. Field insulation of fittings is not allowed.

G304003 1.2 INSULATION

The minimum insulation thickness must be in accordance with the following tables:

Table 1 Insulation Thickness for Drainable/Dryable Systems

Nominal Pipe Diameter inches (mm)	Paroc inches (mm)	Epitherm inches (mm)	Kaylo-10 Thermo-12 Super Caltemp inches (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 Diameter inches (mm)	Calcium Silicate inches (mm)	Polyurethane inches (mm)
1.00 (25)	N/A	N/A
1.5 (38)	N/A	N/A
2.0 (51)	N/A	N/A
2.5 (64)	N/A	N/A
3.0 (76)	1.00 (25)	1.23 (31)
4.0 (100)	1.00 (25)	1.23 (31)
5.0 (125)	N/A	N/A
6.0 (150)	1.5 (38)	1.34 (34)
8.0 (200)	2.0 (51)	1.21 (30)
10.0 (250)	2.5 (64)	1.31 (33)
12.0 (300)	2.0 (51)	1.29 (33)
14.0 (350)	N/A	N/A
16.0 (400)	N/A	N/A
18.0 (450)	N/A	N/A

G304003 1.3 UHDS DESIGN

Design and provide direct buried, factory-prefabricated, pre-insulated main hot water piping, including piping in manholes. Asbestos cement or plastic conduit is not acceptable. The Underground Heat Distribution System (UHDS) representative must be certified in writing by the UHDS manufacturer to be technically qualified and experienced in the installation of the system. Provide a Certificate of Satisfactory Operation certifying that at least 3 systems installed by the UHDS manufacturer within the previous 10 years have and are operating satisfactorily for not less than 5 years. The certificate must include verification information.

G304003 1.4 VALVING

Provide isolation valves on supply and return lines at take-offs for service to each building. Locate valves in valve boxes. Valves must be ASME class 150.

G304003 1.5 EXPANSION

Compensate for piping expansion by utilizing expansion loops.

G304004 UNDERGROUND STEAM DISTRIBUTION SYSTEMS

G304004 1.1 PIPING & FITTINGS

Direct buried, factory pre-fabricated, pre-insulated, steam and condensate piping systems mustl consist of a steel service pipe with polyurethane insulation and a high-density polyethylene (HDPE) jacket. Provide factory fabricated fittings and components. Field insulation of fittings is not allowed.

G304004 1.2 INSULATION

The minimum insulation thickness must be in accordance with the following tables:

Table 1 Insulation Thickness for Drainable/Dryable Systems

Nominal Pipe Diameter inches (mm)	Paroc inches (mm)	Epitherm inches (mm)	Kaylo-10 Thermo-12 Super Caltemp inches (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 Diameter inches (mm)	Calcium Silicate inches (mm)	Polyurethane inches (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 Diameter inches (mm)	Paroc inches (mm)	Epitherm inches (mm)	Kaylo-10 Thermo-12 Super Caltemp inches (mm)
1.00 (25)	2.0 (51)	2.5 (64)	4.0 (100)
1.5 (38)	2.0 (51)	2.5 (64)	4.0 (100)
2.0 (51)	2.5 (64)	3.5 (90)	4.5 (115)
2.5 (64)	2.5 (64)	3.5 (90)	4.5 (115)
3.0 (76)	3.0 (76)	4.0 (100)	5.0 (125)
4.0 (100)	3.0 (76)	4.0 (100)	5.0 (125)
5.0 (125)	3.0 (76)	4.0 (100)	5.0 (125)

6.0 (150)	3.5 (90)	4.5 (115)	5.5 (140)
8.0 (200)	3.5 (90)	4.5 (115)	5.5 (140)
10.0 (250)	4.0 (100)	5.0 (125)	6.0 (150)
12.0 (300)	4.0 (100)	5.0 (125)	6.0 (150)
14.0 (350)	4.0 (100)	5.0 (125)	6.0 (150)
16.0 (400)	4.0 (100)	5.0 (125)	6.0 (150)
18.0 (450)	4.0 (100)	5.0 (125)	6.0 (150)

G304004 1.3 UHDS DESIGN

Design and provide direct buried, factory-prefabricated, pre-insulated main steam and condensate piping in separate conduits and including piping in manholes. Asbestos cement or plastic conduit is not acceptable. The UHDS representative must be certified in writing by the UHDS manufacturer to be technically qualified and experienced in the installation of the system. Provide a Certificate of Satisfactory Operation certifying that at least 3 systems installed by the UHDS manufacturer within the previous 10 years have and are operating satisfactorily for not less than 5 years. The certificate must include verification information.

G304004 1.4 VALVING

Provide isolation valves on supply and return lines at take-offs for service to each building. Locate valves in manholes. Valves must be ASME class 150.

G304004 1.5 EXPANSION

Compensate for piping expansion by utilizing expansion loops. Locate anchors outside manholes.

G304005 REINFORCED CONCRETE MANHOLES & VALVE BOXES

G304005 1.1 MANHOLE CONSTRUCTION

Manholes must be constructed of reinforced, 3000 psi (206.8 bar) concrete and extend a minimum of 6 inches (300 mm) above grade. Depth must be as required to maintain proper pipe slopes. Construct manhole floor and sides in one monolithic pour. Provide galvanized steel or sectioned aluminum, open grate or solid cover as indicated in ESR Section G30. Provide ventilation openings for solid cover. Provide steel ladder with non-slip surfaces and anchored to the wall. Manhole floor and walls must be watertight. Provide sleeves or core drill openings for pipes with modular mechanical seals. Provide sump pit for pump.

G304005 1.2 VALVE BOX CONSTRUCTION

Cast-iron or ductile-iron box of a suitable size. Provide cast-iron or ductile-iron cover for the box with word(s) describing the utility cast on the cover.

G304005 1.3 MANHOLE SUMP PUMPS

Vertical sump pump. Operating temperature design must be 195 degrees F (93 degrees C) minimum. Provide with 2-pole float control.

G304090 OTHER HEATING DISTRIBUTION

G304090 1.1 WARNING & IDENTIFICATION TAPE

Polyethylene plastic tape manufactured specifically for warning and identifying buried utility lines. Warning tape to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording. Color to be white for steam systems.

G304090 1.2 CORROSION PROTECTION

Provide a cathodic protection system for the underground piping system. System must be designed by a National Association of Corrosion Engineers (NACE) certified Cathodic Protection Engineer. The corrosion engineer must obtain soil data and existing system conditions. Corrosion engineer must supervise, inspect and test the installation and performance of the cathodic protection system. Test stations must be post mounted and placed at the manhole or nearby building. Test stations must be located at each end of each cathodically protected section.

G3050 COOLING DISTRIBUTION

G305001 OVERHEAD COOLING SYSTEMS

G305001 1.1 PIPING & FITTINGS

G305001 1.1.1 Chilled and Condenser Water Piping

Chilled and condenser water piping must be electric resistance welded or seamless Schedule 40 black steel pipe conforming to ASTM A 53. Piping 4 inch (100 mm) and smaller may be ASTM B 88 Type K or L copper.

G305001 1.1.2 Steel Pipe Fittings

For piping 2 inch (50 mm) and smaller, provide ANSI/ASME B16.3 malleable iron screwed fittings or ASME B16.11 socket welding (Class 3000) or threaded type (Class 2000). Provide ASME/ANSI B16.9 butt-welding fittings or ASME/ANSI B16.5 flanged type for piping 2-1/2 inch (63 mm) and larger. Grooved joint pipe coupling systems of appropriate pressure rating are acceptable in lieu of welded or screwed fittings.

G305001 1.1.3 Copper Fittings

Provide ANSI B16.18 cast bronze solder joint type or ASME/ANSI B16.22 wrought copper solder joint type.

G305001 1.2 INSULATION

Mineral fiber, Urethane, cellular glass, Faced Phenolic Foam, or Flexible Cellular pipe insulation with aluminum jacket in accordance with ESR Section G30. The minimum insulation thickness must be in accordance with the following table:

Table 1 Insulation Thickness for Cold Water Systems

Nominal Pipe Diameter inches (mm)	Mineral Fiber inches (mm)	Urethane inches (mm)	Cellular Glass inches (mm)	Faced Phenolic Foam inches (mm)	Flexible Cellular inches (mm)
1.00 (25)	1.00 (25)	0.75 (19)	1.5 (38)	1.00 (25)	0.75 (19)
1.5 (38)	1.00 (25)	0.75 (19)	1.5 (38)	1.00 (25)	0.75 (19)
2.0 (51)	1.00 (25)	0.75 (19)	1.5 (38)	1.00 (25)	0.75 (19)
2.5 (64)	1.00 (25)	0.75 (19)	1.5 (38)	1.00 (25)	0.75 (19)
3.0 (76)	1.00 (25)	0.75 (19)	1.5 (38)	1.00 (25)	0.75 (19)
4.0 (100)	1.5 (38)	0.75 (19)	1.5 (38)	1.00 (25)	0.75 (19)
5.0 (125)	1.5 (38)	0.75 (19)	1.5 (38)	1.00 (25)	0.75 (19)
6.0 (150)	1.5 (38)	1.00 (25)	1.5 (38)	1.5 (38)	1.00 (25)
8.0 (200)	1.5 (38)	1.00 (25)	1.5 (38)	1.5 (38)	1.00 (25)
10.0 (250)	1.5 (38)	1.00 (25)	1.5 (38)	1.5 (38)	1.00 (25)
12.0 (300)	1.5 (38)	1.00 (25)	1.5 (38)	1.5 (38)	1.00 (25)
14.0 (350)	1.5 (38)	1.00 (25)	1.5 (38)	1.5 (38)	1.00 (25)
16.0 (400)	1.5 (38)	1.00 (25)	1.5 (38)	1.5 (38)	1.00 (25)

18.0 (450)	1.5 (38)	1.00 (25)	1.5 (38)	1.5 (38)	1.00 (25)

G305001 1.3 SUPPORTS

Provide MSS SP-58 and MSS SP-69, adjustable supports with insulation protection saddles. Provide stainless steel axles for rollers. Provide support poles with guy wires and hardware.

G305001 1.4 EXPANSION

Compensate for piping expansion by utilizing expansion loops and joints. Provide guided slip or flexible ball expansion joints.

G305002 UNDERGROUND COOLING SYSTEMS

G305002 1.1 PIPING & FITTINGS

Direct buried, factory-prefabricated, pre-insulated, chilled water piping systems. Fittings and accessories must be designed and factory-fabricated to prevent moisture from entering into the system. Backfill and install to meet the requirements of the piping system manufacturer.

G305002 1.2 VALVES

Provide isolation valves on supply and return lines at take-offs for service to each building. Locate valves in valve boxes.

G305090 OTHER COOLING DISTRIBUTION

G305090 1.1 EXPANSION

Compensate for piping expansion by utilizing expansion loops. Locate anchors outside manholes.

G305090 1.2 WARNING & IDENTIFICATION TAPE

Polyethylene plastic tape manufactured specifically for warning and identifying buried utility lines. Warning tape to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording.

G305090 1.3 CORROSION PROTECTION

Provide a cathodic protection system for the underground chilled water and condenser water piping system. System must be designed by a National Association of Corrosion Engineers (NACE) certified Cathodic Protection Engineer. The corrosion engineer must obtain soil data and existing system conditions. Corrosion engineer must supervise, inspect and test the installation and performance of the cathodic protection system. Test stations must be post mounted and placed at the manhole or nearby building. Test stations must be located at each end of each

cathodically protected section.

G3060 FUEL DISTRIBUTION

G306001 LIQUID FUEL DISTRIBUTION PIPING

Underground pipe lines shall be fuel grade double-walled pipe with monitoring sumps where pipe transitions to above ground. Sumps shall be sealed and shall have constant electronic monitoring.

G306001 1.1 MATERIALS

Fuel piping must be ASTM A 53, Type E (electric-resistance welded, Grade A or B) or Type S (seamless, Grade A or B), black steel 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.

For underground fuel distribution lines, provide nondetectable warning tape for the full length of each run of piping. Warning tape to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording. Color to be yellow for fuel lines.

G306003 LIQUID FUEL STORAGE TANKS

G306003 1.1 STORAGE TANKS

Double wall in accordance with UL 2085. Provide secondary containment and leak monitoring with a capacity to meet the system requirements. Provide with overfill and spill containment, overfill protection and vents.

G306003 1.2 FUEL PUMPS

Fuel pumps must 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

Double wall in accordance with UL 2085 with secondary containment and leak monitoring with a capacity to meet the system requirements. Provide with overfill and spill containment, overfill protection, vents, 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 must be ASTM A 53, Type E (electric-resistance welded, Grade A or B) or Type S (seamless, Grade A or B), black steel. Provide Weight Class STD (Standard) for welding end connections. Provide Weight Class XS (Extra Strong) for threaded end connections.

G306006 1.2 POLYETHYLENE (PE)

PE pipe and heat fusion fittings must conform to ASTM D 2513, Grade PE2406 or PE3408.

G306007 GAS STORAGE TANKS

G306007 1.1 PROPANE STORAGE TANKS

ASME labeled tank in accordance with NFPA 58 with a capacity to meet the system requirements.

G306009 OTHER GAS DISTRIBUTION

G306009 1.1 WARNING & IDENTIFICATION TAPE

Detectable aluminum foil, plastic backed tape or detectable magnetic plastic tape manufactured specifically for warning and identifying buried piping. Warning tape to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording. Color to be yellow for gas lines.

-- End of Section --

SECTION G40

SITE ELECTRICAL UTILITIES
09/22

G40 GENERAL

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

G40 1.1 NARRATIVE

This section covers installations exterior to the facility outside the five foot line. See PTS Section D50, *Electrical*, for continuation of systems inside the five foot line, into and inside the building.

G40 1.2 ELECTRICAL DESIGN GUIDANCE

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

When all product Quality Control information is included in the Unified Facility Criteria (UFC) and there are requirement options identified in the ESR, then the Uniformat Level 4 titles (and possible subtitles) are included without repetition of requirements. One example of this is G401008, GROUNDING SYSTEMS.

G40 1.2.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s): UFC 3-501-01, Electrical Engineering)
UFC 1-200-02	High Performance and Sustainable Building Requirements
UFC 3-570-02N	Electrical Engineering Cathodic Protection

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS 26 11 13.00 20	Primary Unit Substation
UFGS 26 11 16	Secondary Unit Substations
UFGS 26 12 19.10	Three-Phase, Liquid-Filled Pad-Mounted Transformers
UFGS 26 12 21	Single-Phase Pad-Mounted Transformers
UFGS 26 13 00	SF6/High-Firepoint Fluids Insulated Pad-Mounted Switchgear
UFGS 26 23 00	Low-Voltage Switchgear
UFGS 26 24 13	Switchboards
UFGS 26 27 14.00 20	Electricity Metering
UFGS 26 56 00	Exterior Lighting
UFGS 33 71 01	Overhead Transmission and Distribution
UFGS 33 71 02	Underground Electrical Distribution
UFGS 33 82 00	Telecommunications Outside Plant (OSP)

G40 1.3 QUALITY ASSURANCE

Submit qualifications, certifications, and Test Plans indicated herein 45 calendar days prior to the expected date of execution. Notify the Contracting Officer 14 calendar days prior to all testing. Submit test results within 7 calendar days of completion of testing.

The Designer of Record is responsible for approving the submittals listed below.

G40 1.3.1 Qualified Testing Organization

Engage the services of a qualified testing organization to provide inspection, testing, calibration, and adjustment of the electrical distribution system and equipment listed in paragraph entitled "Acceptance Tests and Inspections" herein. Organization must be independent of the supplier, manufacturer, and installer of the equipment. The organization must be a first tier subcontractor.

a. Submit name and qualifications of organization. Organization must have been regularly engaged in the testing of electrical materials, devices, installations, and systems for a minimum of 5 years. The organization must have a calibration program, and test instruments used must be calibrated in accordance with NETA ATS.
b. Submit name and qualifications of the lead engineering technician performing the required testing services. Include a list of three comparable jobs performed by the technician with specific names and telephone numbers for reference. Testing, inspection, calibration, and adjustments must be performed by an engineering technician, certified by NETA or the National Institute for Certification in Engineering Technologies (NICET) with a minimum of 5 years' experience inspecting, testing, and calibrating electrical distribution and generation equipment, systems, and devices.

G40 1.3.2 NEC Qualified Worker

Provide in accordance with NFPA 70. Qualified Workers are allowed to be assisted by helpers on a 1 to 1 ratio, provided such helpers are registered in recognized apprenticeship programs. Submit a certification confirming NEC Qualified Worker requirements.

G40 1.3.3 Qualified Medium Voltage Electrician

All workers on medium voltage electrical crews must have 5 years experience working medium voltage systems on similar projects involving the same or higher voltage.

G40 1.3.4 Qualified Cable Splicer (Medium Voltage Cable)

The cable splicer/terminator must have a certification from the National Cable Splicing Certification Board (NCSCB) in the field of splicing and terminating shielded medium voltage (5 kV to 35 kV) power cable using pre-manufactured kits (pre-molded, heat-shrink, cold-shrink). Submit proof of certification for the individuals that will be performing cable splicer and termination work 30 days before splices or terminations are to be made.

G40 1.3.5 Qualified PV Installer

Installation of photovoltaic systems must be performed by experienced and trained installers. At minimum the PV installation supervisor must hold a "PV Installer Certification" as issued by the North American Board of Certified Energy Practitioners or hold a Certified Solar Roofing Professional (CSRP) credential issued by RISE "Roof Integrated Solar Energy Inc".

G40 1.3.6 Qualified Cable Splicer (Telecommunications)

Certification must include the training, and experience of the individual on specific type and classification of

telecommunications cable to be provided under this contract.

G40 1.3.7 Qualified Cable Installer and Splicer (Fiber Optic Cable)

Certification must include the training, and experience of the individual on specific type and classification of Fiber Optic media to be provided under this contract.

G40 1.3.8 Qualified Fiber Optic (FO) Cable Manufacturer

The FO media manufacturer must have a minimum of 3 years experience in the manufacturing, assembly, and factory testing of FO media that complies with RUS REA Bull 1753F-601 (PE-90). Manufacturer must provide a list of customers with 3 years of maintenance logs documenting experience with government customers.

G40 1.3.9 Material Standards

Ensure service support and provide manufacturer's nameplate in accordance with PTS Section Z10, *General Performance Technical Specification*.

G40 1.3.9.1 Warning Labels

Each enclosure of electrical equipment, including substations, pad-mounted transformers, pad-mounted switches, pad-mounted sectionalizing termination cabinets, and switchgear, must have a warning label identifying the enclosure as 1) containing energized electrical equipment and 2) an arc flash hazard. Provide arc flash warning labels in accordance with UFC 3-560-01, *Electrical Safety, O & M*.

G40 1.3.10 Factory Testing

The Government reserves the right to witness all factory testing. The manufacturer's calibration program must ensure that all test instruments are maintained within rated accuracy.

G40 1.3.11 Electrical System Startup and Testing

Submit test plans for approval. Tailor test plans to the systems provided.

The test plan must list make and model and provide functional description of the test instruments and accessories and must describe the setup of the tests to be conducted. Test instruments must be capable of measuring and recording or displaying test data at a higher resolution and greater accuracy than specified for the equipment's performance.

G40 1.3.11.1 Factory Trained Engineer

Provide a factory trained engineer to supervise start-up and testing as required in referenced specifications.

G40 1.3.11.2 Performance Verification Testing

Perform in-service demonstration that all circuits and devices are in operating condition. Tests must confirm that each item of control equipment will function not less than five times. Provide all necessary test equipment, tools, fuel, load banks, labor, and materials for testing. As a minimum, test all systems in accordance with manufacturer's recommendations. Additional testing requirements for the various systems are described with those systems, hereinafter. Assure that all test instruments are maintained within rated accuracy. Dated calibration labels must be visible on all test equipment.

Submit a separate electrical field test plan in accordance with manufacturer's recommendations and that conforms to NETA ATS for each piece of Electrical Distribution Equipment and System requiring Performance Verification Testing.

The following items identify specific test requirements. Additional test requirements are contained in the applicable UFGS.

a. Cable – Test cable in accordance with the manufacturer's recommendations and NETA ATS. Adhere to precautions and limits as specified in the applicable NEMA/ICEA Standard for the specific cable.
b. Grounding - Test ground systems in accordance with the manufacturer's recommendations and NETA ATS.
c. Site Lighting - Contractor's Quality Control (CQC) representative must perform a field survey of site lighting systems in accordance with IESNA for acceptance. Show that the lighting system operates in accordance with the user’s requirements and is in accordance with designed levels. Provide certification that the measured lighting levels conform to the design requirements.
d. Telecommunications wiring - Test all cables in accordance with industry standards.

G40 1.3.11.3 Acceptance Tests and Inspections

The Qualified Testing Organization must provide the Acceptance Tests and Inspections test plan and procedures and perform the acceptance tests and inspections. Test methods, procedures, and test values must be performed and evaluated in accordance with NETA ATS, the manufacturer's recommendations, and paragraph entitled "Field Quality Control" of each applicable specification section. Tests identified as optional in NETA ATS are not required unless otherwise specified. Place equipment in service only after completion of required tests and evaluation of the test results have been completed. Contractor must supply to the testing organization complete sets of shop drawings, settings of adjustable devices, and other information

necessary for an accurate test and inspection of the system prior to the performance of any final testing.

Specific test requirements are contained in the UFGS for equipment.

G40 1.4 DESIGN SUBMITTALS

Submit design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, and UFC 3-501-01, *Electrical Engineering*.

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

UFGS 26 11 13.00 20, *Primary Unit Substation*

UFGS 26 11 16, *Secondary Unit Substations*

UFGS 26 12 19.10, *Three-Phase, Liquid-Filled Pad-Mounted Transformers*

UFGS 26 12 21, *Single-Phase Pad-Mounted Transformers*

UFGS 26 13 00, *SF6/High-Firepoint Fluids Insulated Pad-Mounted Switch Gear*

UFGS 26 23 00, *Low-Voltage Switchgear*

UFGS 26 24 13, *Switchboards*

UFGS 26 27 14.00 20, *Electricity Metering*

UFGS 26 56 00, *Exterior Lighting*

UFGS 33 71 01, *Overhead Transmission and Distribution*

UFGS 33 71 02, *Underground Electrical Distribution*

UFGS 33 82 00, *Telecommunications Outside Plant (OSP)*

G40 1.4.1 Sustainable Design Submittal

Submit sustainable design submittals in accordance with Part 2 UFGS Section 01 33 29, *Sustainability Requirements and Reporting*.

G40 1.5 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with PTS Section Z10,

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

OMSI Information for Electrical Equipment (if OMSI Manual for the entire project is not already required); all "G" item submittals listed in the submittals of the specifications sections identified in the Design Submittals paragraph above; and all "G" item submittals listed for Government Surveillance in Part 2 Section 01 33 00.05 20, *Construction Submittal Procedures*.

Provide certification that all adjustable protective device settings have been set in accordance with the coordination study for the as-built equipment and configuration.

G40 1.5.1 Sustainable Construction Submittal

Submit sustainable construction submittals in accordance with Part 2 UFGS Section 01 33 29, *Sustainability Requirements and Reporting*.

G4010 ELECTRICAL DISTRIBUTION

G401001 SUBSTATIONS

When secondary unit substations are required, the Designer of Record must utilize UFGS Section 26 11 16, *Secondary Unit Substations*, UFGS Section 26 23 00, *Low-Voltage Switchgear*, and UFGS Section 26 24 13, *Switchboards*, for the project specification, and must 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 must utilize UFGS Section 26 12 19.10, *Three-Phase, Liquid-Filled Pad-Mounted Transformers*, UFGS Section 26 12 21, *Single-Phase Pad Mounted Transformers*, or UFGS Section 33 71 01, *Overhead Transmission and Distribution*, for the project specification, and submit the edited specification section as a part of the design submittal for the project.

G401003 SWITCHES, CONTROLS AND DEVICES

When switches or control devices are required, the Designer of Record must utilize UFGS Section 26 13 00, *SF6/High-Firepoint Fluids Insulated Pad Mounted Switchgear*, or UFGS Section 33 71 01, *Overhead Transmission and Distribution*, for the project specification, and submit the edited specification section as a part of the design submittal for the project.

G401004 OVERHEAD ELECTRIC CONDUCTORS

Power line conductors must be strung in accordance with manufacturer's standard sag and tension recommendations.

G401005 TOWERS, POLES, CROSSARMS AND INSULATORS

Wood poles must comply with ANSI 05.1 and RUS 1728F-700. Pressure treat poles in accordance with AWPA C1 and AWPA C4 as referenced in RUS 1728F-700. The quality of each pole must be ensured with "WQC" (wood quality control) brand on each piece or by an approved inspection agency report. Do not use creosote treated poles, lodgepole pine, and western larch pine poles.

Concrete poles must comply with ANSI loadings for distribution poles.

Determine the size of poles required, class, height and other data, to meet requirements of the pole line. Provide wood, steel, or fiberglass crossarms in accordance with industry and local standards. Insulators, cutouts and associated equipment must be determined by the Designer of Record to meet system requirements.

G401006 UNDERGROUND ELECTRIC CONDUCTORS

Route underground cables to minimize splices. Cable pulling tensions must not exceed the maximum pulling tension recommended by the cable manufacturer. Medium voltage cable termination must be suitable for the location installed and meet IEEE Std. 48 Class 1 requirements.

G401007 DUCTBANKS, MANHOLES, HANDHOLES AND RACEWAYS

Concrete manholes and handholes to be standard type precast concrete. Composite/Fiberglass handholes must be polymer concrete reinforced with a heavy weave fiberglass reinforcing. Provide manholes and handholes with load ratings suitable for the location installed.

G401008 GROUNDING SYSTEMS

G401009 METERING

When metering is required the Designer of Record must utilize UFGS section 26 27 14.00 20 for the project specification and submit the edited specification section as part of the design submittal for the project.

G401010 CATHODIC PROTECTION SYSTEMS

Provide cathodic protection systems 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

Comply with ANSI/ASHRAE/IES 90.1 for all exterior lighting applications and controls. Comply with UFC 3-530-01 for reduction of light pollution.

Provide SPD at panelboards that include circuits feeding exterior lighting systems.

Coordinate the design and luminaire selection with the landscape designer. Such coordination must ensure the location of poles do not conflict with tree locations.

When exterior lighting is required the Designer of Record must utilize UFGS section 26 56 00 for the project specification and submit the edited specification section as part of the design submittal for the project.

G402002 SPECIAL SECURITY LIGHTING SYSTEM

G402003 OTHER AREA LIGHTING

G402004 LIGHTING POLES

Poles must meet International Building Code for street lighting poles, and AASHTO loadings for highway and sports lighting poles taking into account the effective projected areas of the luminaries provided. Provide direct set or anchor-base type poles designed for use with underground supply conductors.

G402005 UNDERGROUND ELECTRIC CONDUCTORS

Provide in accordance with Paragraph G401006.

G402006 DUCTBANKS, MANHOLES AND HANDHOLES

Provide handholes and underground conduits for site lighting in accordance with Paragraph G401007.

G402007 GROUNDING SYSTEMS

G4030 SITE COMMUNICATION AND SECURITY

G403001 TELECOMMUNICATIONS SYSTEMS

G403002 CABLE TV SYSTEMS (CATV)

G403003 CABLES AND WIRING

Provide underground copper cable pair in accordance with RUS 345-67. Provide aerial cable in accordance with RUS 345-67 except that it must be suitable for aerial installation and must be Figure 8 distribution wire with 6,000 pound (26,700 N) Class A galvanized steel or 6,000 pound (26,700 N) aluminum-clad steel strand. Screen-compartmental core cable must be filled cable meeting the requirements of RUS 345-67. Fiber optic media must meet all performance requirements of EIA/TIA-568-A and the physical requirements of ICEA S 87-640 and EIA/TIA-598-A.

G403004 DUCTBANKS, MANHOLES AND HANDHOLES

Provide in accordance with paragraph G401007.

G403005 TOWERS, POLES AND STANDS

Provide in accordance with paragraph G401005.

G403006 TV CAMERAS AND MONITORS

G403007 ELECTRONIC SECURITY SYSTEM (ESS)

G403008 OTHER COMMUNICATION AND ALARM

G403009 GROUNDING SYSTEMS

G403010 INDUSTRIAL CONTROL SYSTEMS (ICS)

G4090 OTHER ELECTRICAL UTILITIES

G409007 PHOTOVOLTAIC ENERGY SYSTEM

When a photovoltaic system is required, provide a grid tied, photovoltaic system, including structural support system, crystalline photovoltaic panels, combiner boxes, and inverters. The Designer of Record must utilize UFGS Section 26 31 00 for the project specification, and submit the edited specification section as a part of the design submittal for the project.

G409007 1.1 CODES AND STANDARDS

Provide PV system hardware and services that meet or exceed all applicable local, State and utility requirements, conform to the applicable codes and standards, and have passed the listing and qualification tests, listed below. (Comply with the most recent version of each document).

a. IEEE 1262 "Recommended Practice for Qualification of Photovoltaic Modules".
b. PowerMark certification for PV modules.
c. IEEE Standard 928-1986, Recommended Criteria for Terrestrial Photovoltaic Power Systems (PV system performance criteria).
d. IEEE 1547 Standard for Interconnecting Distributed Resources with Electric Power Systems.
e. Underwriters Laboratories 1741 (UL Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources).
f. Underwriters Laboratories 1703 (UL Standard for Listing Photovoltaic Modules).
g. Certification of PV Equipment: All PV modules, inverters, and electrical components are required to be listed or recognized by an appropriate and recognized United States Safety Laboratory (for example: UL or ETL).

G409007 1.2 PHOTOVOLTAIC APPLICATION ANALYSIS

Provide a comprehensive "Photovoltaic Application Analysis" with a detailed description of system, application, site shading conditions and expected kW output of the photovoltaic application. Utilize the Solmetric Suneye or the Solar Pathfinder shading analyzers to analyze the effects of the existing site shading conditions. Include estimated PV output in kWh per year in the analysis.

G409007 1.3 TECHNICAL REQUIREMENTS

Work responsibilities include at a minimum: system design, equipment selection, and PV system installations. Provide system

individually capable of providing peak power output of at least proposed PV system size, 208 or 480 volt, 3-phase, 4-wire power.

The final System configuration must allow automatic operation without operator intervention. Design system and specify equipment to minimize maintenance requirements. System must include metering that is integrated with current AMI network (Advanced Metering Infrastructure) and planned energy metering projects.

Locate inverter(s) disconnects and associated electrical equipment in an area that is accessible, weather-protected, and secure from vandalism and personal injury.

Mount disconnects and over current devices in approved boxes, enclosures, or panel boards. Provide DC rated disconnects and switches when used in DC applications. Bond metal enclosures and boxes to the grounding conductor.

At a minimum, electrical meters must capture the following data on individual system performance (minimum solar irradiance, DC power, AC real power, AC current, AC voltage, and power factor (recommend ION 8600 for AC); ambient air temperature, PV cell temperature, kW, and kWh). This data must be captured at hourly intervals for a minimum one year. Units of temperature, power, and current must be in Fahrenheit, Watts, and Amps respectively.

Transformers, if required, must have a minimum efficiency based on factory test results of not less than the efficiency indicated in 10 CFR 431, Subpart K, paragraph 431.196(b). Transformers must be housed in NEMA 4X enclosures.

Mounting structures must be corrosion resistant to marine environment.

Provide permanent plaque or directory at each building service and power source identifying all other building services and power sources.

-- End of Section --

SECTION Z10

GENERAL PERFORMANCE TECHNICAL SPECIFICATION
06/23

Z10 GENERAL

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

Z10 1.1 NARRATIVE

All Performance Technical Specification (PTS) sections must be used in conjunction with all parts of the Design Build (D/B) Request for Proposal (RFP) to determine the full requirements of this solicitation. This PTS section provides general requirements for the other PTS sections of this RFP and is used in conjunction with the other PTS sections.

Refer to Part 2 Section 01 33 10.05 20, *Design Submittal Procedures* for the Order of Precedence of the RFP Parts. Requirements listed in the Project Program take precedence over the PTS sections requirements; therefore, requirements identified in the Project Program eliminate options related to that requirement in the PTS sections.

Z10 1.2 DESIGN GUIDANCE

Provide work in compliance with the following design standards and codes, as a minimum. Government standards listed in this RFP take precedence over industry standards.

The PTS Sections reference published standards, the titles of which can be found in the *Unified Master Reference List (UMRL)*on the Whole Building Design Guide at the Unified Facilities Guide Specification (UFGS) Website . The publications referenced form a part of this specification to the extent referenced. The publications are referred to in the section text by the basic designation only. Industry standards, codes, and Government standards referenced in the section text, and not found in the UMRL, are listed at the beginning of the PTS sections.

The advisory provisions of all referenced codes, standards, and specifications must be mandatory; substitute words such as "must", or "required" for words such as "should", "may", or "recommended," wherever they appear. The results of these wording substitutions incorporate these code and standard statements as requirements. Reference to the "authority having jurisdiction" for variance from criteria must be interpreted to mean the "Chief Engineer, NAVFAC" and for contractual obligations on this project must be interpreted to mean the "Contracting Officer". Comply with the required and advisory

portions of the current edition of the standard at the time of contract award.

The following list of codes and standards is not comprehensive and is augmented by other codes and standards referenced and cross-referenced in the RFP.

Z10 1.2.1 INDUSTRY CODES

INTERNATIONAL BUILDING CODE (IBC) as modified by UFC 1-200-01. UFC 1-200-01 applies the IBC to the project and references other commercial standards and UFC criteria that become part of the contract.

Z10 1.2.2 INDUSTRY REQUIREMENTS

WHOLE BUILDING DESIGN GUIDE (WBDG)

WHOLE BUILDING DESIGN GUIDE, Ensure Occupant Safety and Health (Systems Safety Engineering) at https://www.wbdg.org/design-objectives/secure-safe/occupant-safety-health

Z10 1.2.3 GOVERNMENT STANDARDS

Z10 1.2.3.1 UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (UFC 1-200-01 is a hub document that provides general building requirements and references other critical UFCs. A reference to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs listed therein.)
UFC 1-200-02	High Performance and Sustainable Building Requirements
FC 1-300-09N	Navy and Marine Corps Design Procedures

Z10 1.2.3.2 FEDERAL STANDARDS

Architectural Barriers Act Standards with DEPSECDEF Memorandum 31 Oct 2008, "Access for People with Disabilities"

Occupational Safety and Health Administration (OSHA)

Z10 1.3 MATERIALS AND EQUIPMENT REQUIREMENTS IDENTIFICATION

Z10 1.3.1 MATERIALS STANDARD

Refer to the Project Program for identification of Government Furnished Equipment.

The equipment items must be supported by service organizations that are convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

Materials, equipment, fixtures, and other appurtenances must comply with applicable Underwriters Laboratories, (UL) Inc., American National Standards Institute, Inc., and National Electrical Manufacturer's Association standards or applicable standards of a similar independent testing organization. All materials must be new, and must bear the label of Underwriters Laboratories whenever standards have been established and label service is normally and regularly furnished by the agency. All equipment provided must be listed and labeled suitable for the specified purpose, environment, and application and installed in accordance with manufacturer’s recommendations. Insulation must be asbestos free.

Z10 1.3.2 EQUIPMENT NAMEPLATE IDENTIFICATION

Each item of equipment must have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place. The nameplate of the distributing agent will not be acceptable.

Z10 1.3.3 FIELD-APPLIED NAMEPLATES

Provide laminated plastic nameplates for each piece of equipment. Each nameplate must identify the function and, when applicable, the number designation of that piece of equipment as used in the design documents. Provide melamine plastic nameplates, 0.125 inch (3 mm) thick, white with black center core.

Z10 1.4 COMMISSIONING

Commission the building systems identified in Part 3 Chapter 2.0 "Project Objectives", paragraph titled "Building Commissioning". Refer to Part 2 Section 01 45 00, *Quality Control* for the Commissioning Authority's required qualifications and responsibilities and comply with UFGS 01 91 00.15, *Building Commissioning* modified as necessary to include all applicable systems included in the final design. Test reports must be certified by the Commissioning Authority (CA), that work is in compliance with requirements of the RFP.

Z10 1.5 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTS

Verification of satisfactory construction and system performance must be via Performance Verification Testing, Acceptance Tests, and submittal of test reports certified by the Designer of Record (DOR), that work is in compliance with requirements of the RFP. The Government reserves the right to witness all Performance Verification and Acceptance Tests, review data, and request other such additional inspections and repeat tests as necessary to ensure that the work and provided services conform to the stated requirements. Contractor must pay the cost of all testing.

Refer to each PTS section to identify Performance Verification and Acceptance Testing required by the work specified in that PTS section.

Z10 1.6 SUBMITTALS

Contractor's design submittals that combines design and construction submittals, must jointly comply with Part 2 Sections 01 33 00.05 20, *Construction Submittal Procedures* and 01 33 10.05 20, *Design Submittal Procedures*. Contractor's construction submittals that are submitted separate from the design submittals must comply with Part 2 Section 01 33 00.05 20, *Construction Submittal Procedures*.

Refer to "Construction Quality Control" in Part 2 Sections 01 33 00.05 20, *Construction Submittal Procedures* and 01 45 00, *Quality Control* to define reviewing and approving Authority of design and construction submittals.

Utilize the same materials and equipment that are approved and provided for an initial facility design, on all follow-on facilities that use the same design with-in this contract. Once the initial facility design is approved by the Government, the Contractor must obtain Government approval to change materials and equipment when designing and constructing follow-on facilities utilizing the same design.

Z10 1.6.1 DESIGN SUBMITTALS

Submit design submittals in accordance with Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, and other discipline-specific guidelines listed in the applicable PTS sections.

Part 2 Section 01 33 10.05 20, *Design Submittal Procedures* requires the use of UFGS sections in the development of the Contractor originated specification. The Designer of Record (DOR) must edit the UFGS sections for the project and submit the edited specification as a part of the design submittal. The DOR must edit the UFGS as follows:

(1) Prepare UFGS Specifications as part of the project specification,

(2) Delete only portions of the UFGS specification that are not applicable to the project,

(3) Edit only the bracketed choices that are within the UFGS specification text,

(4) Edit blank bracketed options to include requirements that exercise prudence and adherence to acceptable industry standards,

(5) Comply with the directions, directives, and requirements of all UFGS Criteria Notes. The UFGS Criteria Notes are typically bordered on the top and bottom by a line of asterisks to highlight their location.

(6) If proprietary information is provided or required to

streamline the construction submittal process, include proprietary information in the edited UFGS sections and added to the end of each UFGS section. Confirm that the proprietary products, materials, and systems listed in the specifications are in compliance with the requirements of the RFP.

Z10 1.6.2 CONSTRUCTION SUBMITTALS

Submit for approval to the Designer of Record (DOR), construction submittals, product data, manufacturer's information, shop drawings, and test reports on all materials and systems installed in the project, unless the DOR designates submittal for QC approval. Refer to each PTS section for further construction submittal requirements relating to the work identified in that particular PTS section. Some PTS sections reference UFGS sections that will require more construction submittals for DOR approval than is stated above. Refer to Part 2 Section 01 33 00.05 20 for the list of construction submittals reserved for Government Approval and Government Surveillance.

--End of Section--

PART 5 – PRESCRIPTIVE SPECIFICATIONS

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SECTION 02 41 00

DEMOLITION
08/22

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.

AIR-CONDITIONING, HEATING AND REFRIGERATION INSTITUTE (AHRI)

AHRI Guideline K	(2009) Guideline for Containers for Recovered Non-Flammable Fluorocarbon Refrigerants

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 145	(1991; R 2012) Standard Specification for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes
AASHTO T 180	(2025) Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP A10.6	(2006) Safety & Health Program Requirements for Demolition Operations - American National Standard for Construction and Demolition Operations

ASTM INTERNATIONAL (ASTM)

ASTM D2487	(2017; R 2025) Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

CARPET AND RUG INSTITUTE (CRI)

CRI 104	(2015) Carpet Installation Standard for Commercial Carpet
CRI 105	(2015) Carpet Installation Standard for Residential Carpet

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements

U.S. DEFENSE LOGISTICS AGENCY (DLA)

DLA 4145.25	(Jun 2000; Reaffirmed Oct 2010) Storage and Handling of Liquefied and Gaseous Compressed Gases and Their Full and Empty Cylinders; https://www.dla.mil/Portals/104/Documents/DispositionServices/ddsr/docs/cylinderjointpub.pdf

U.S. DEPARTMENT OF DEFENSE (DOD)

DOD 4000.25-1-M	(2006) MILSTRIP - Military Standard Requisitioning and Issue Procedures
MIL-STD-129	(2014; Rev R; Change 1 2018; Change 2 2019; Change 3 2023) Military Marking for Shipment and Storage

U.S. FEDERAL AVIATION ADMINISTRATION (FAA)

FAA AC 70/7460-1	(2016; Rev L; Change 2) Obstruction Marking and Lighting

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

40 CFR 61	National Emission Standards for Hazardous Air Pollutants
40 CFR 82	Protection of Stratospheric Ozone
49 CFR 173.301	Shipment of Compressed Gases in Cylinders and Spherical Pressure Vessels

1.2 PROJECT DESCRIPTION

1.2.1 Definitions

1.2.1.1 Critical Root Zone (CRZ)

The critical root zone is the area around and under a tree where the majority of its roots are located. The CRZ is usually measured as a circle with a radius that's 1.5- foot for every inch of the tree's diameter at breast height (DBH), and a depth of 24 inches.

1.2.1.2 Demolition

Demolition is the process of tearing apart and removing any feature of a facility together with any related handling and disposal operations.

1.2.1.3 Deconstruction

Deconstruction is the process of taking apart a facility with the primary goal of preserving the value of all useful building materials.

1.2.1.4 Demolition Plan

Demolition Plan is the planned steps and processes for managing demolition activities and identifying the required sequencing activities and disposal mechanisms.

1.2.1.5 Deconstruction Plan

Deconstruction Plan is the planned steps and processes for dismantling all or portions of a structure or assembly, to include managing sequencing activities, storage, re-installation activities, salvage and disposal mechanisms.

1.2.2 Demolition/Deconstruction Plan

Prepare a Demolition Plan and submit proposed demolition and removal procedures for approval before work is started. Include in the plan procedures for careful removal and disposition of materials specified to be salvaged, coordination with other work in progress, a disconnection schedule of utility services and a detailed description of methods and equipment to be used for each operation and of the sequence of operations. Identify components and materials to be salvaged for reuse or recycling with reference to paragraph Existing Facilities to be Removed. Append tracking forms for all removed materials indicating type, quantities, condition, destination, and end use. Coordinate with Waste Management Plan in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL. Include statements affirming Contractor inspection of the existing roof deck and its suitability to perform as a safe working platform or if inspection reveals a safety hazard to workers, state provisions for securing the safety of the workers throughout the performance of the work. Provide procedures for safe conduct of the work in accordance with EM 385-1-1. Plan must be approved by Contracting Officer prior to work beginning.

1.2.3 General Requirements

Do not begin demolition or deconstruction until authorization is received from the Contracting Officer. The work of this section is to be performed in a manner that maximizes the value derived from the salvage and recycling of materials. Remove rubbish and debris from the project site; do not allow accumulations inside or outside the buildings. The work includes demolition, salvage of identified items and materials, and removal of resulting rubbish and debris. Remove rubbish and debris from Government property daily, unless otherwise directed. Store materials that cannot be removed daily in areas specified by the Contracting Officer.

In the interest of occupational safety and health, perform the work in accordance with EM 385-1-1, Section 17, Demolition, and other applicable Sections.

1.3 ITEMS TO REMAIN IN PLACE

Comply with FAR 52.236-9 to protect existing vegetation, structures, equipment, utilities, and improvements. Coordinate the work of this section with all other work indicated. Construct and maintain shoring, bracing, and supports as required. Ensure that structural elements are not overloaded. Increase structural supports or add new supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract. Do not overload structural elements. Provide new supports and reinforcement for existing construction weakened by demolition, deconstruction, or removal work. Repairs, reinforcement, or structural replacement require approval by the Contracting Officer prior to performing such work.

1.3.1 Existing Construction Limits and Protection

Do not disturb existing construction beyond the extent indicated or necessary for installation of new construction. Provide temporary shoring and bracing for support of building components to prevent settlement or other movement. Provide protective measures to control accumulation and migration of dust and dirt in all work areas. Remove snow, dust, dirt, and debris from work areas daily.

1.3.2 Weather Protection

For portions of the building to remain, protect building interior and materials and equipment from the weather at all times. Where removal of existing roofing is necessary to accomplish work, have materials and workmen ready to provide adequate and temporary covering of exposed areas.

1.3.3 Trees

Protect the trees that are to remain and might be damaged during demolition or deconstruction by a 4 foot high polyethylene fence. Erect and secure fence to protect the critical root zone (CRZ) using a 1.5-foot protection radius for each 1 inch of tree diameter measured at breast height (DBH) or edge of tree canopy, whichever is greater. Replace any tree designated to remain that is damaged during the work under this contract in accordance with tree mitigation requirements and approved by the Contracting Officer.

1.3.4 Utility Service

Maintain existing utilities indicated to stay in service and protect against damage during demolition and deconstruction operations. Prior to start of work, utilities serving each area of alteration or removal will be shut off by the Government and disconnected and sealed by the Contractor.

1.3.5 Facilities

Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities. Floors, roofs, walls, columns, pilasters, and other structural components that are designed and constructed to stand without lateral support or shoring, and are determined to be in stable condition, must remain standing without additional bracing, shoring, or lateral support until demolished or deconstructed, unless directed otherwise by the Contracting Officer. Ensure that no elements determined to be unstable are left unsupported and place and secure bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract.

1.4 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted. Where burning is permitted, adhere to federal, state, and local regulations.

1.5 AVAILABILITY OF WORK AREAS

Areas in which the work is to be accomplished will be available at

contract award.

1.6 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Demolition Plan; G

Existing Conditions

SD-07 Certificates

Notification; G

SD-11 Closeout Submittals

Receipts

1.7 QUALITY ASSURANCE

Submit timely notification of demolition and renovation projects to Federal, State, regional, and local authorities in accordance with 40 CFR 61, Subpart M. Notify the Regional Office of the United States Environmental Protection Agency (USEPA), State's environmental protection agency, local air pollution control district/agency, and the Contracting Officer in writing 10 working days prior to the commencement of work in accordance with 40 CFR 61, Subpart M. Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the "Contract Clauses," conform to the safety requirements contained in ASSP A10.6. Comply with the Environmental Protection Agency requirements specified. Use of explosives will not be permitted.

1.7.1 Dust and Debris Control

Prevent the spread of dust and debris and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution. Vacuum and dust the work area daily. Sweep pavements as often as necessary to control the spread of debris.

1.8 PROTECTION

1.8.1 Traffic Control Signs

a. Where pedestrian and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights. Notify the Contracting Officer prior to beginning such work.

Provide a minimum of 2 FAA type L-810 steady burning red obstruction lights on temporary structures (including cranes) over 100 feet, but less than 200 ft, above ground level. The use of LED based obstruction lights are not permitted. For temporary structures (including cranes) over 200 ft above ground level provide obstruction

lighting in accordance with FAA AC 70/7460-1. Perform light construction and installation in compliance with FAA AC 70/7460-1. Lights must be operational during periods of reduced visibility, darkness, and as directed by the Contracting Officer. Maintain the temporary services during the period of construction and remove only after permanent services have been installed and tested and are in operation.

1.8.2 Protection of Personnel

Before, during and after the demolition work continuously evaluate the condition of the site specific features and structure being demolished and take immediate action to protect all personnel working in and around the project site. No area, section, or component of floors, roofs, walls, columns, pilasters, or other structural element will be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while workmen remove debris or perform other work in the immediate area.

1.9 RELOCATIONS

Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Repair or replace items to be relocated which are damaged by the Contractor with new undamaged items as approved by the Contracting Officer.

1.10 EXISTING CONDITIONS

Before beginning any demolition work, survey the site and examine the drawings and specifications to determine the extent of the work. Record existing conditions in the presence of the Contracting Officer or the Contracting Officer's Representative showing the condition of structures and other facilities adjacent to areas of alteration or removal. Photographs or electronic images with a minimum resolution of 3072 x 2304 pixels, capable of a print resolution of 300 dpi, will be acceptable as a record of existing conditions. Include in the record the elevation of the top of foundation walls, finish floor elevations, possible conflicting electrical conduits, plumbing lines, alarms systems, the location and extent of existing cracks and other damage and description of surface conditions that exist prior to starting work. It is the Contractor's responsibility to verify and document all required outages which will be required during the course of work, and to note these outages on the record document. Submit survey results to the Contracting Officer or the Contracting Officer's Representative.

PART 2 PRODUCTS

2.1 FILL MATERIAL

a. Comply with excavating, backfilling, and compacting procedures for soils used as backfill material to fill basements, voids, depressions or excavations resulting from demolition or deconstruction of structures. Provide fill material consisting of waste products from demolition or deconstruction until all waste appropriate for this purpose is consumed.

b. Provide fill material conforming to the definition of satisfactory soil material as defined in ASTM D2487, AASHTO M 145, Soil Classification Groups A-1, A-2-4, A-2-5 and A-3. In addition, fill

material must be free from roots and other organic matter, trash, debris, frozen materials, and stones larger than 2 inches in any dimension.

c. Proposed fill material must be sampled and tested by an approved soil testing laboratory, as follows:

Soil classification	AASHTO M 145
Moisture-density relations	AASHTO T 180, Method B or D

PART 3 EXECUTION

3.1 EXISTING FACILITIES TO BE REMOVED

Inspect and evaluate existing structures onsite for reuse. Disassemble existing construction scheduled to be removed for reuse. Dismantled and removed materials are to be separated, set aside, and prepared as specified, and stored or delivered to a collection point for reuse, remanufacture, recycling, or other disposal, as specified. Designate materials for reuse onsite whenever possible.

3.1.1 Structures

a. Remove existing structures indicated to be removed. Remove interior walls, other than retaining walls and partitions, to the top of concrete slab on ground. Break up basement slabs to permit drainage. Remove sidewalks, curbs, gutters and street light bases as indicated.

b. Demolish structures in a systematic manner from the top of the structure to the ground. Complete demolition work above each tier or floor before the supporting members on the lower level are disturbed. Demolish concrete and masonry walls in small sections. Remove structural framing members and lower to ground by means of derricks, platforms hoists, or other suitable methods as approved by the Contracting Officer.

c. Locate demolition and deconstruction equipment throughout the structure and remove materials so as to not impose excessive loads to supporting walls, floors, or framing.

3.1.2 Utilities and Related Equipment

3.1.2.1 General Requirements

Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the Contracting Officer. Do not interrupt existing utilities serving facilities occupied and used by the Government except when approved in writing and then only after temporary utility services have been approved and provided. Do not begin demolition or deconstruction work until all utility disconnections have been made. Shut off and cap utilities for future use, as indicated.

3.1.2.2 Disconnecting Existing Utilities

Remove existing utilities, as indicated and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the Contracting Officer. When utility lines are encountered but are not indicated on the drawings, notify the Contracting

Officer prior to further work in that area. Remove meters and related equipment and deliver to a location in accordance with instructions of the Contracting Officer.

3.1.3 Chain Link Fencing

Remove chain link fencing, gates and other related salvaged items scheduled for removal and transport to designated areas. Remove gates as whole units. Cut chain link fabric to 25 foot lengths and store in rolls off the ground.

3.1.4 Paving and Slabs

Remove ground concrete and asphaltic concrete paving and slabs including aggregate base to a depth of 4 inches below grade. Demolition of concrete pavement and other heavy duty pavements will follow methods in G10 Site Preparations. Move, grind and store pavement and slabs designated to be recycled and utilized in this project as directed by the Contracting Officer. Remove pavement and slabs not to be used in this project from the installation at Contractor's expense.

3.1.5 Roofing

Remove existing roof system and associated components in their entirety down to existing roof deck. Cut existing membrane and insulation along straight lines. Remove roofing system and insulation without damaging the roof deck. Sequence work to minimize building exposure between demolition and new roof materials installation.

3.1.5.1 Temporary Roofing

Install temporary roofing and flashing as necessary to maintain a watertight condition throughout the course of the work. Remove temporary work prior to installation of permanent roof system materials unless approved otherwise by the Contracting Officer. Make provisions for worker safety during demolition, deconstruction, and installation of new materials as described in paragraphs entitled "Statements" and "Regulatory and Safety Requirements."

3.1.5.2 Reroofing

When removing the existing roofing system from the roof deck, remove only as much roofing as can be recovered by the end of the work day, unless approved otherwise by the Contracting Officer. Do not attempt to open the roof covering system in threatening weather. Reseal all openings prior to suspension of work the same day.

3.1.6 Masonry

Sawcut and remove masonry so as to prevent damage to surfaces to remain, and to facilitate the installation of new work. Where new masonry adjoins existing, abut or tie the new work into the existing construction as specified for the new work. Provide square, straight edges and corners where existing masonry adjoins new work and other locations. Salvage masonry removed in whole blocks and store for reuse.

3.1.7 Concrete

Saw concrete along straight lines to a depth of a minimum 2 inch. Make

each cut in walls perpendicular to the face and in alignment with the cut in the opposite face. Break out the remainder of the concrete provided that the broken area is concealed in the finished work, and the remaining concrete is sound. At locations where the broken face cannot be concealed, grind smooth or saw cut entirely through the concrete. Salvage removed concrete. Sawcuts in existing concrete sidewalk, roads, and parking areas must be at the nearest existing expansion joint or weakened plane joint and at full depth.

3.1.8 Structural Steel

Dismantle structural steel at field connections and in a manner that will prevent bending or damage. Salvage for recycle structural steel, steel joists, girders, angles, plates, columns and shapes. Flame-cutting torches are permitted when other methods of dismantling are not practical. Transport steel joists and girders as whole units and not dismantled. Transport structural steel shapes to a designated recycling facility, stacked according to size, type of member and length, and stored off the ground, protected from the weather.

3.1.9 Miscellaneous Metal

Salvage shop-fabricated items such as access doors and frames, steel gratings, metal ladders, wire mesh partitions, metal railings, metal windows and similar items as whole units. Salvage light-gage and cold-formed metal framing, such as steel studs, steel trusses, metal gutters, roofing and siding, metal toilet partitions, toilet accessories and similar items. Recycle scrap metal as part of demolition operations. Provide separate containers to collect scrap metal and transport to a scrap metal collection or recycling facility, in accordance with the Waste Management Plan.

3.1.10 Carpentry

Salvage for recycle lumber, millwork items, and finished boards, and sort by type and size. Chip or shred and recycle salvaged wood unfit for reuse, except stained, painted, or treated wood. Remove windows, doors, frames, and cabinets, and similar items as whole units, complete with trim and accessories. Do not remove hardware attached to units, except for door closers. Brace the open end of door frames to prevent damage.

3.1.11 Carpet

Remove existing carpet for reclamation in accordance with manufacturer recommendations and as follows. Remove used carpet in large pieces, roll tightly, and pack neatly in a container. Remove adhesive according to recommendations of the Carpet and Rug Institute (CRI). Provide adhesive removal solvents in compliance with CRI 104/CRI 105. Recycle removed carpet cushion.

3.1.12 Acoustic Ceiling Tile

Remove, neatly stack, and recycle acoustic ceiling tiles. Recycling may be available with manufacturer. Otherwise, give priority to a local recycling organization. Recycling is not required if the tiles contain or may have been exposed to asbestos material.

3.1.13 Patching

Where removals leave holes and damaged surfaces exposed in the finished work, patch and repair these holes and damaged surfaces to match adjacent finished surfaces, using on-site materials when available. Where new work is to be applied to existing surfaces, perform removals and patching in a manner to produce surfaces suitable for receiving new work. Make finished surfaces of patched area flush with the adjacent existing surface and match the existing adjacent surface as closely as possible to texture and finish. Provide patching as specified and indicated, and include the following:

a. Concrete and Masonry: Completely fill holes and depressions, caused by previous physical damage or left as a result of removals in existing masonry walls to remain, with an approved masonry patching material, applied in accordance with the manufacturer's printed instructions.

3.1.14 Air Conditioning Equipment

Remove air conditioning, refrigeration, and other equipment containing refrigerants without releasing chlorofluorocarbon refrigerants to the atmosphere in accordance with the Clean Air Act Amendment of 1990. Recover all refrigerants prior to removing air conditioning, refrigeration, and other equipment containing refrigerants and dispose of in accordance with the paragraph entitled "Disposal of Ozone Depleting Substance (ODS)." Turn in salvaged Class I ODS refrigerants as specified in paragraph, "Salvaged Materials and Equipment."

3.1.15 Cylinders and Canisters

Remove all fire suppression system cylinders and canisters and dispose of in accordance with the paragraph entitled "Disposal of Ozone Depleting Substance (ODS)."

3.1.16 Locksets on Swinging Doors

Remove all locksets from all swinging doors indicated to be removed and disposed of. Deliver the locksets and related items to a designated location for receipt by the Contracting Officer after removal.

3.1.17 Mechanical Equipment and Fixtures

Disconnect mechanical hardware at the nearest connection to existing services to remain, unless otherwise noted. Disconnect mechanical equipment and fixtures at fittings. Remove service valves attached to the unit. Salvage each item of equipment and fixtures as a whole unit; listed, indexed, tagged, and stored. Salvage each unit with its normal operating auxiliary equipment. Transport salvaged equipment and fixtures, including motors and machines, to a designated storage area as directed by the Contracting Officer. Do not remove equipment until approved. Do not offer low-efficiency equipment for reuse; provide to recycling service for disassembly and recycling of parts.

3.1.17.1 Preparation for Storage

Remove water, dirt, dust, and foreign matter from units; drain tanks, piping and fixtures; if previously used to store flammable, explosive, or other dangerous liquids, steam clean interiors. Seal openings with caps, plates, or plugs. Secure motors attached by flexible connections to the

unit. Change lubricating systems with the proper oil or grease.

3.1.17.2 Piping

Disconnect piping at unions, flanges and valves, and fittings as required to reduce the pipe into straight lengths for practical storage. Store salvaged piping according to size and type. If the piping that remains can become pressurized due to upstream valve failure, attach end caps, blind flanges, or other types of plugs or fittings with a pressure gage and bleed valve to the open end of the pipe to ensure positive leak control. Carefully dismantle piping that previously contained gas, gasoline, oil, or other dangerous fluids, with precautions taken to prevent injury to persons and property. Store piping outdoors until all fumes and residues are removed. Box prefabricated supports, hangers, plates, valves, and specialty items according to size and type. Wrap sprinkler heads individually in plastic bags before boxing. Classify piping not designated for salvage, or not reusable, as scrap metal.

3.1.17.3 Ducts

Classify removed duct work as scrap metal.

3.1.17.4 Fixtures, Motors and Machines

Remove and salvage fixtures, motors and machines associated with plumbing, heating, air conditioning, refrigeration, and other mechanical system installations. Salvage, box and store auxiliary units and accessories with the main motor and machines. Tag salvaged items for identification, storage, and protection from damage. Classify non-porcelain broken, damaged, or otherwise unserviceable units and not caused to be broken, damaged, or otherwise unserviceable as debris to be disposed of by the Contractor.

3.1.18 Electrical Equipment and Fixtures

Salvage motors, motor controllers, and operating and control equipment that are attached to the driven equipment. Salvage wiring systems and components. Box loose items and tag for identification. Disconnect primary, secondary, control, communication, and signal circuits at the point of attachment to their distribution system.

3.1.18.1 Fixtures

Remove and salvage electrical fixtures. Salvage unprotected glassware from the fixture and salvage separately. Salvage incandescent, mercury-vapor, and fluorescent lamps and fluorescent ballasts manufactured prior to 1978, boxed and tagged for identification, and protected from breakage.

3.1.18.2 Electrical Devices

Remove and salvage switches, switchgear, transformers, conductors including wire and nonmetallic sheathed and flexible armored cable, regulators, meters, instruments, plates, circuit breakers, panelboards, outlet boxes, and similar items. Box and tag these items for identification according to type and size.

3.1.18.3 Wiring Ducts or Troughs

Remove and salvage wiring ducts or troughs. Dismantle plug-in ducts and wiring troughs into unit lengths. Remove plug-in or disconnecting devices from the busway and store separately.

3.1.18.4 Conduit and Miscellaneous Items

Salvage conduit except where embedded in concrete or masonry. Consider corroded, bent, or damaged conduit as scrap metal. Sort straight and undamaged lengths of conduit according to size and type. Classify supports, knobs, tubes, cleats, and straps as debris to be removed and disposed.

3.1.19 Elevators and Hoists

Remove elevators, hoists, and similar conveying equipment and salvage as whole units, to the most practical extent. Remove and prepare items for salvage without damage to any of the various parts. Salvage and store rails for structural steel with the equipment as an integral part of the unit.

3.1.20 Items With Unique/Regulated Disposal Requirements

Remove and dispose of items with unique or regulated disposal requirements in the manner dictated by law or in the most environmentally responsible manner.

3.2 CONCURRENT EARTH-MOVING OPERATIONS

Do not begin excavation, filling, and other earth-moving operations that are sequential to demolition or deconstruction work in areas occupied by structures to be demolished or deconstructed until all demolition and deconstruction in the area has been completed and debris removed. Fill holes, open basements and other hazardous openings.

3.3 DISPOSITION OF MATERIAL

3.3.1 Title to Materials

Except for salvaged items specified in related Sections, and for materials or equipment scheduled for salvage, all materials and equipment removed and not reused or salvaged, become the property of the Contractor and must be removed from Government property. Materials approved for storage by the Contracting Officer must be removed before completion of the contract. Title to materials resulting from demolition and deconstruction, and materials and equipment to be removed, is vested in the Contractor upon approval by the Contracting Officer. The Government will not be responsible for the condition or loss of, or damage to, such property after contract award. Showing for sale or selling materials and equipment on site is prohibited.

3.3.2 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. Coordinate the re-use of materials and equipment with the re-use requirements in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL. Capture re-use of materials in the diversion calculations for

the project.

3.3.3 Salvaged Materials and Equipment

Remove 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, as directed by the Contracting Officer.

a. Salvage items and material to the maximum extent possible.

b. Store all materials salvaged for the Contractor as approved by the Contracting Officer and remove from Government property before completion of the contract. Coordinate the salvaged materials with tracking requirements in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL. Capture salvaged materials in the diversion calculations for the project.

c. Remove salvaged items to remain the property of the Government in a manner to prevent damage, and packed or crated to protect the items from damage while in storage or during shipment. Items damaged during removal or storage must be repaired or replaced to match existing items. Properly identify the contents of containers.

d. Remove the items reserved as property of the using service prior to commencement of work under this contract.

e. Remove historical items in a manner to prevent damage. Deliver the following historical items to the Government for disposition: Corner stones, contents of corner stones, and document boxes wherever located on the site.

f. Remove and capture all Class I ODS refrigerants in accordance with the Clean Air Act Amendment of 1990, and turn in to the Navy by shipping the refrigerant container to the Defense Logistics Agency at the following address:

(1) Defense Depot Richmond VA (DDRV)
(2) SW0400
(3) Cylinder Operations
(4) 00 Jefferson Davis Highway
(5) Richmond, VA 23297-5900

3.3.4 Disposal of Ozone Depleting Substance (ODS)

Class I and Class II ODS are defined in Section, 602(a) and (b), of The Clean Air Act. Prevent discharge of Class I and Class II ODS to the atmosphere. Place recovered ODS in cylinders meeting AHRI Guideline K suitable for the type ODS (filled to no more than 80 percent capacity) and provide appropriate labeling. Remove recovered ODS from Government property and dispose of in accordance with 40 CFR 82. Dispose products, equipment and appliances containing ODS in a sealed, self-contained system (e.g. residential refrigerators and window air conditioners) in accordance with 40 CFR 82. Submit Receipts or bills of landing, as specified. Submit a shipping receipt or bill of lading for all containers of ozone depleting substance (ODS) shipped to the Defense Depot, Richmond, Virginia.

3.3.4.1 Special Instructions

No more than one type of ODS is permitted in each container. Apply a

warning/hazardous label to the containers in accordance with Department of Transportation regulations. Provide a tag with the following information on all cylinders including but not limited to fire extinguishers, spheres, or canisters containing an ODS:

a. Activity name and unit identification code

b. Activity point of contact and phone number

c. Type of ODS and pounds of ODS contained

d. Date of shipment

e. National stock number (for information, call (804) 279-4525).

3.3.4.2 Fire Suppression Containers

Deactivate fire suppression system cylinders and canisters with electrical charges or initiators prior to shipment. Also, safety caps must be used to cover exposed actuation mechanisms and discharge ports on these special cylinders.

3.3.5 Transportation Guidance

Ship all ODS containers in accordance with MIL-STD-129, DLA 4145.25 (also referenced one of the following: Army Regulation 700-68, Naval Supply Instruction 4440.128C, Marine Corps Order 10330.2C, and Air Force Regulation 67-12), 49 CFR 173.301, and DOD 4000.25-1-M.

3.3.6 Unsalvageable and Non-Recyclable Material

Dispose of unsalvageable and non-recyclable noncombustible material in the disposal area identified by the Contracting Officer. Maintain the fill in the disposal area below elevation and after disposal is completed, uniformly grade the disposal area to drain. Dispose of unsalvageable and non-recyclable combustible material in the sanitary fill area off the site.

3.4 CLEANUP

Remove debris and rubbish from project site and similar excavations. Remove and transport the debris in a manner that prevents spillage on streets or adjacent areas. Apply local regulations regarding hauling and disposal.

3.5 DISPOSAL OF REMOVED MATERIALS

3.5.1 Regulation of Removed Materials

Dispose of debris, rubbish, scrap, and other nonsalvageable materials resulting from removal operations with all applicable federal, state and local regulations as contractually specified in the Waste Management Plan. Storage of removed materials on the project site is prohibited.

3.5.2 Burning on Government Property

Burning of materials removed from demolished and deconstructed structures will not be permitted on Government property. Control fires for protection of persons and property. Monitor fires continuously until the fires have burned out or have been extinguished. Comply with Federal,

State and local laws regulating the building and maintaining of brush and trash fires.

3.5.3 Removal to Spoil Areas on Government Property

Transport noncombustible materials removed from demolition and deconstruction structures to designated spoil areas on Government property.

3.5.4 Removal from Government Property

Transport waste materials removed from demolished and deconstructed structures, except waste soil, from Government property for legal disposal. Dispose of waste soil per Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS.

3.6 REUSE OF SALVAGED ITEMS

Recondition salvaged materials and equipment designated for reuse before installation. Replace items damaged during removal and salvage operations or restore them as necessary to usable condition.

-- End of Section --

SECTION 02 82 00

ASBESTOS REMEDIATION
08/25

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.

AECOM

HazMat Report	Hazardous Material Report

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP Z9.2	(2018) Fundamentals Governing the Design and Operation of Local Exhaust Ventilation Systems

ASTM INTERNATIONAL (ASTM)

ASTM D522/D522M	(2017; R 2021) Mandrel Bend Test of Attached Organic Coatings
ASTM D2794	(1993; R 2024) Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
ASTM D4397	(2016; R 2023) Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications
ASTM E84	(2025) Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM E96/E96M	(2024a) Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials
ASTM E119	(2024) Standard Test Methods for Fire Tests of Building Construction and Materials
ASTM E736/E736M	(2019) Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members
ASTM E1368	(2023) Standard Practice for Visual Inspection of Asbestos Abatement Projects

COMPRESSED GAS ASSOCIATION (CGA)

CGA G-7	(2019) Standard for Compressed Air for Human Respiration; 6th Edition

INTERNATIONAL SAFETY EQUIPMENT ASSOCIATION (ISEA)

ANSI/ISEA Z87.1	(2025) Occupational and Educational Personal Eye and Face Protection Devices

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 701	(2023; ERTA 1 2023) Standard Methods of Fire Tests for Flame Propagation of Textiles and Films

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH NMAM	(2020; 5th Ed) NIOSH Manual of Analytical Methods

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 340/1-90-018	(1990) Asbestos/NESHAP Regulated Asbestos Containing Materials Guidance
EPA 560/5-85-024	(1985) Guidance for Controlling Asbestos-Containing Materials in Buildings (Purple Book)

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

29 CFR 1910.147	The Control of Hazardous Energy (Lock Out/Tag Out)
29 CFR 1926.51	Sanitation
29 CFR 1926.59	Hazard Communication
29 CFR 1926.103	Respiratory Protection
29 CFR 1926.200	Accident Prevention Signs and Tags
29 CFR 1926.1101	Asbestos
40 CFR 61-SUBPART A	General Provisions
40 CFR 61-SUBPART M	National Emission Standard for Asbestos
40 CFR 763	Asbestos
42 CFR 84	Approval of Respiratory Protective Devices
49 CFR 107	Hazardous Materials Program Procedures

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

U.S. NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND (NAVFAC)

NAVFAC P-502	(2017) Asbestos Program Management
ND OPNAV M-5100.23	(2020; Rev G) Navy Safety and Occupational Health Manual

UL SOLUTIONS (UL)

UL 586	(2009; Reprint Sep 2022) UL Standard for Safety High-Efficiency Particulate, Air Filter Units

1.2 DEFINITIONS

1.2.1 Amended Water

Water containing a wetting agent or surfactant with a maximum surface tension of 0.00042 psi.

1.2.2 Area Sampling

Sampling of asbestos fiber concentrations which approximates the concentrations of asbestos in the theoretical breathing zone but is not actually collected in the breathing zone of an employee.

1.2.3 Asbestos

The term asbestos includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite and any of these minerals that have been chemically treated or altered.

1.2.4 Asbestos Containing Material (ACM)

Any material which contains greater than 1 percent asbestos.

1.2.5 Asbestos Control Area

That area where asbestos removal operations are performed which is isolated by physical boundaries which assist in the prevention of the uncontrolled release of asbestos dust, fibers, or debris.

1.2.6 Asbestos Fibers

Those fibers having an aspect ratio of at least 3:1 and longer than 5 micrometers as determined by National Institute for Occupational Safety and Health (NIOSH) Method 7400.

1.2.7 Asbestos Permissible Exposure Limit

0.1 fibers per cubic centimeter of air as an 8-hour time weighted average measured in the breathing zone as defined by 29 CFR 1926.1101 or other Federal legislation having legal jurisdiction for the protection of workers health.

1.2.8 Authorized Person

Any person authorized by the Contractor and required by work duties to be present in the regulated areas.

1.2.9 Background

The ambient airborne asbestos concentration in an uncontaminated area as measured prior to any asbestos hazard abatement efforts. Background concentrations for other (contaminated) areas are measured in similar but asbestos free locations.

1.2.10 Competent Person (CP)

A person meeting the requirements for competent person as specified in 29 CFR 1926.1101 including a person capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt corrective measures to eliminate them, and is specifically trained in a training course which meet the criteria of EPA's Model Accreditation Plan (40 CFR 763) for project designer or supervisor, or its equivalent. The competent person must have a current State of Virginia asbestos contractors or supervisors license.

1.2.11 Contractor

The Contractor is that individual, or entity under contract to perform the herein listed work.

1.2.12 Disposal Bag

A 6 mil thick, leak-tight plastic bag, pre-labeled in accordance with 29 CFR 1926.1101, used for transporting asbestos waste from containment to disposal site.

1.2.13 Disturbance

Activities that disrupt the matrix of ACM, crumble or pulverize ACM, or generate visible debris from ACM. Disturbance includes cutting away small amounts of ACM, no greater than the amount which can be contained in one standard sized glovebag or waste bag, not larger than 60 inches in length and width or as required by state or local regulations in order to access a building component.

1.2.14 Encapsulation

The abatement of an asbestos hazard through the appropriate use of a physical barrier or chemical encapsulants.

1.2.15 Encapsulants

Specific materials in various forms used to chemically or physically entrap asbestos fibers in various configurations to prevent these fibers from becoming airborne. There are four types of encapsulants as follows which must comply with performance requirements as specified herein.

a. Removal Encapsulant (can be used as a wetting agent)

b. Bridging Encapsulant (used to provide a tough, durable surface coating to asbestos containing material)

c. Penetrating Encapsulant (used to penetrate the asbestos containing material encapsulating all asbestos fibers and preventing fiber release due to routine mechanical damage)

d. Lock-Down Encapsulant (used to seal off or "lock-down" minute asbestos fibers left on surfaces from which asbestos containing material has been removed).

1.2.16 Friable Asbestos Material

A term defined in 40 CFR 61-SUBPART M and EPA 340/1-90-018 meaning any material which contains more than 1 percent asbestos, as determined using the method specified in 40 CFR 763, Polarized Light Microscopy (PLM), that when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.

1.2.17 Glovebag Technique

Those asbestos removal and control techniques put forth in 29 CFR 1926.1101.

1.2.18 HEPA Filter Equipment

High efficiency particulate air (HEPA) filtered vacuum and exhaust ventilation equipment with a filter system capable of collecting and retaining asbestos fibers. Filters must retain 99.97 percent of particles 0.3 microns or larger as indicated in UL 586.

1.2.19 Model Accreditation Plan (MAP)

USEPA training accreditation requirements for persons who work with asbestos as specified in 40 CFR 763.

1.2.20 Negative Pressure Enclosure (NPE)

That engineering control technique described as a negative pressure enclosure in 29 CFR 1926.1101 or applicable state regulations.

1.2.21 NESHAP

National Emission Standards for Hazardous Air Pollutants. The USEPA NESHAP regulation for asbestos is at 40 CFR 61-SUBPART M. Requirements associated with demolition and renovation activities are found in Section 61.145 of the NESHAP while requirements associated with waste disposal are found in Section 61.150.

1.2.22 Nonfriable Asbestos Material

Material that contains asbestos in which the fibers have been immobilized by a bonding agent, coating, binder, or other material so that the asbestos fibers are not normally released during appropriate use, handling, storage or transportation. It is understood that asbestos fibers may be released under other conditions such as demolition, removal, or mishap.

1.2.23 Permissible Exposure Limits (PELs)

1.2.23.1 PEL-Time Weighted Average(TWA)

Concentration of asbestos not in excess of 0.1 fibers per cubic centimeter of air (f/cc) as an 8-hour time weighted average (TWA).

1.2.23.2 PEL-Excursion Limit

An airborne concentration of asbestos not in excess of 1.0 f/cc of air as averaged over a sampling period of 30 minutes.

1.2.24 Personal Sampling

Air sampling which is performed to determine asbestos fiber concentrations within the breathing zone of a specific employee, as performed in accordance with 29 CFR 1926.1101.

1.2.25 Presumed ACM

Any material which cannot be sampled at the time of the initial inspection due to inaccessibility, structural or safety concerns (such as charged electrical components), or could void active warranties (such as roofing materials). Presumed ACM must be managed as ACM unless proven to not be ACM through testing by a qualified and certified asbestos professional.

1.2.26 Private Qualified Person (PQP)

A Registered Architect, Professional Engineer, Certified Industrial Hygienist, consultant or other qualified person who has successfully completed training and is therefore accredited under a legitimate State Model Accreditation Plan as described in 40 CFR 763 as a Building Inspector, Contractor/Supervisor Abatement Worker, and Asbestos Project Designer. The PQP that collects samples and elects to analyze samples on site must successfully complete the National Institute of Occupational Safety and Health (NIOSH) 582 course "Sampling and Evaluating Airborne Asbestos Dust" or equivalent, and must participate in the American Industrial Hygiene Association (AIHA) Asbestos Analysis Registry (AAR). The PQP must be appropriately licensed in the State of Virginia.

1.2.27 TEM

Refers to Transmission Electron Microscopy.

1.2.28 Thermal System Insulation

Thermal system insulation (TSIACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain.

1.2.29 Time Weighted Average (TWA)

The TWA is an 8-hour time weighted average airborne concentration of asbestos fibers.

1.2.30 Transite

A generic name for asbestos cement wallboard and pipe.

1.2.31 Wetting Agent

A chemical added to water to reduce the water's surface tension thereby increasing the water's ability to soak into the material to which it is applied. An equivalent wetting agent must have a surface tension of at most 0.00042 psi.

1.2.32 Worker

Individual (not designated as the Competent Person or a supervisor) who performs asbestos work and has completed asbestos worker training required by 29 CFR 1926.1101, to include EPA Model Accreditation Plan (MAP) "Worker" training; accreditation, if required by the OSHA Class of work to be performed or by the state where the work is to be performed. The worker must be appropriately licensed in the State of Virginia.

1.3 REQUIREMENTS

1.3.1 Description of Work

The work covered by this section includes the handling and control of asbestos containing materials and describes some of the resultant procedures and equipment required to protect workers, the environment and occupants of the building or area, or both, from contact with airborne asbestos fibers. The work also includes the disposal of any asbestos containing materials generated by the work. More specific operational procedures must be outlined in the Asbestos Hazard Abatement Plan called for elsewhere in this specification. The asbestos work includes the demolition and removal of asbestos-containing material which is governed by 40 CFR 763 and NAVFAC P-502. Under normal conditions non-friable or chemically bound materials containing asbestos would not be considered hazardous; however, this material may release airborne asbestos fibers during demolition and removal and therefore must be handled in accordance with the removal and disposal procedures as specified herein. Provide negative pressure enclosure techniques as outlined in this specification. The work area must be evacuated during the asbestos abatement work. A competent person must supervise asbestos removal work as specified herein.

1.3.1.1 Wallboard/Joint Compound

Both composite samples of the wallboard and discrete samples of the components (wallboard and joint compound) have been tested and results are included in the HazMat Report.

1.3.2 Unexpected Discovery of Asbestos

Notify the Contracting Officer if any previously untested building components suspected to contain asbestos are impacted by the work.

1.3.3 Medical Requirements

Provide medical requirements including but not limited to medical surveillance and medical record keeping as listed in 29 CFR 1926.1101.

1.3.3.1 Medical Examinations

Contractor must submit documentation of workers who perform activities potentially impacted ACM including the name of each employee, type of exam received, and date of the exam. The documentation must also include a signed statement that the medical examination was reviewed by the contractor's Safety Manager stating that the listed personnel have received the required medical examination in accordance with 29 CFR 1926.1101 and the exam results are saved. This requirement must have been satisfied within the 12 months prior to the start of work on this contract. The same medical examination must be given on an annual basis to employees engaged in an occupation involving asbestos and within 30 calendar days before or after the termination of employment in such occupation. Specifically identify x-ray films of asbestos workers to the consulting radiologist and mark medical record jackets with the word "ASBESTOS."

1.3.3.2 Medical Records

Maintain complete and accurate records of employees' medical examinations, medical records, and exposure data for a period of 30 years after termination of employment and make records of the required medical examinations and exposure data available for inspection and copying to: The Assistant Secretary of Labor for Occupational Safety and Health (OSHA), or authorized representatives of them, and an employee's physician upon the request of the employee or former employee.

1.3.4 Employee Training

Submit certificates, prior to the start of work but after the main abatement submittal, signed by each employee indicating that the employee has received training in the proper handling of materials and wastes that contain asbestos in accordance with 40 CFR 763; understands the health implications and risks involved, including the illnesses possible from exposure to airborne asbestos fibers; understands the use and limits of the respiratory equipment to be used; and understands the results of monitoring of airborne quantities of asbestos as related to health and respiratory equipment as indicated in 29 CFR 1926.1101 on an initial and annual basis. Organize certificates by individual worker, not grouped by type of certification. Make training requirement records readily available in accordance with 40 CFR 763. Train personnel involved in the asbestos control work in accordance with United States Environmental Protection Agency (USEPA) Asbestos Hazard Emergency Response Act (AHERA) training criteria or State training criteria whichever is more stringent. Document the training by providing: dates of training, training entity, course outline, names of instructors, and qualifications of instructors upon request by the Contracting Officer. Furnish each employee with respirator training and fit testing administered by the PQP as required by 29 CFR 1926.1101 and 29 CFR 1926.103. Fully cover engineering and other hazard control techniques and procedures. Asbestos workers must have a current State of Virginia asbestos worker's license.

1.3.5 Permits, Licenses, and Notifications

Prior to the start of work, obtain necessary permits and licenses in conjunction with asbestos removal, encapsulation, hauling, and disposition, and furnish notification of such actions required by Federal, State, regional, and local authorities. Notify the Regional Office of the United States Environmental Protection Agency (USEPA), State's environmental protection agency, local air pollution control district/agency, local/City Asbestos Control Bureau and the Contracting Officer in writing 20 working days prior to commencement of work in accordance with 40 CFR 61-SUBPART M and State of Virginia. Notify the Contracting Officer and other appropriate Government agencies in writing 20 working days prior to the start of asbestos work as indicated in applicable laws, ordinances, criteria, rules, and regulations. Submit copies of all Notifications to the Contracting Officer. Notify the local fire department 3 days prior to removing fire-proofing material from the building including notice that the material contains asbestos.

1.3.6 Environment, Safety and Health Compliance

In addition to detailed requirements of this specification, comply with those applicable laws, ordinances, criteria, rules, and regulations of Federal, State, regional, and local authorities regarding handling, storing, transporting, and disposing of asbestos waste materials. Comply with the applicable requirements of the current issue of EM 385-1-1, 29 CFR 1926.1101, 40 CFR 61-SUBPART A, 40 CFR 61-SUBPART M, 40 CFR 763 and ND OPNAV M-5100.23. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting the work. Where the requirements of this specification, applicable laws, rules, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirement as defined by the Government apply.

1.3.7 Respiratory Protection Program

Establish and implement a respirator program as required by 29 CFR 1926.1101, and 29 CFR 1926.103 and applicable state and local regulations. Submit a written description of the program to the Contracting Officer. Submit a written program manual or operating procedure including methods of compliance with regulatory statutes.

1.3.7.1 Respirator Program Records

Submit records of the respirator program as required by 29 CFR 1926.103, and 29 CFR 1926.1101.

1.3.7.2 Respirator Fit Testing

The Contractor's PQP must conduct a qualitative or quantitative fit test conforming to 29 CFR 1926.103 for each worker required to wear a respirator, and any authorized visitors who enter a regulated area where respirators are required to be worn. A respirator fit test must be performed prior to initially wearing a respirator and every 12 months thereafter. If physical changes develop that affects the fit, a new fit test must be performed. Functional fit checks must be performed each time a respirator is put on and in accordance with the manufacturer's recommendation.

1.3.7.3 Respirator Selection and Use Requirements

Provide respirators, and ensure that they are used as required by 29 CFR 1926.1101 and in accordance with CGA G-7 and the manufacturer's recommendations. Respirators must be approved by the National Institute for Occupational Safety and Health NIOSH, under the provisions of 42 CFR 84, for use in environments containing airborne asbestos fibers. For air-purifying respirators, the particulate filter must be high-efficiency particulate air (HEPA)/(N-,R-,P-100). The initial respirator selection and the decisions regarding the upgrading or downgrading of respirator type must be made by the Contractor's Designated IH based on the measured or anticipated airborne asbestos fiber concentrations to be encountered.

1.3.8 Asbestos Hazard Control Supervisor

The Contractor must be represented on site by a supervisor, trained using the model Contractor accreditation plan as indicated in the Federal statutes for all portions of the herein listed work.

1.3.9 Hazard Communication

Adhere to all parts of 29 CFR 1926.59 and provide the Contracting Officer with a copy of the Safety Data Sheets (SDS) for all materials brought to the site.

1.3.10 Asbestos Hazard Abatement Plan

Submit a detailed plan of the safety precautions such as lockout, tagout, tryout, fall protection, and confined space entry procedures and equipment and work procedures to be used in the removal of materials containing asbestos. The plan, not to be combined with other hazard abatement plans, must be prepared, signed, and sealed by the PQP. Provide a Table of Contents for each abatement submittal, which follows the sequence of requirements in the contract. The plan must include but not be limited to the precise personal protective equipment to be used including, but not limited to, respiratory protection, type of whole-body protection and if reusable coveralls are to be employed, an outer disposable layer such as disposable whole body cover must be employed over the top of the coveralls, the location of asbestos control areas including clean and dirty areas, buffer zones, showers, storage areas, change rooms, removal method, interface of trades involved in the construction, sequencing of asbestos related work, disposal plan, type of wetting agent and asbestos sealer to be used, locations of local exhaust equipment, planned air monitoring strategies, and a detailed description of the method to be employed in order to control environmental pollution. The plan must also include (both fire and medical emergency) response plans and an Activity Hazard Analyses (AHAs) in accordance with EM 385-1-1. The Asbestos Hazard Abatement Plan must be approved in writing prior to starting any asbestos work. The Contractor, Asbestos Hazard Control Supervisor, CP and PQP must meet with the Contracting Officer prior to beginning work, to discuss in detail the Asbestos Hazard Abatement Plan, including work procedures and safety precautions. Once approved by the Contracting Officer, the plan will be enforced as if an addition to the specification. Any changes required in the specification as a result of the plan must be identified specifically in the plan to allow for free discussion and approval by the Contracting Officer prior to starting work.

1.3.11 Testing Laboratory

Submit the name, address, telephone number, and appliable laboratory certification(s) of each testing laboratory selected for the sampling, analysis, and reporting of airborne concentrations of asbestos fibers along with evidence that each laboratory selected holds the appropriate State license and permits and certification that each laboratory is American Industrial Hygiene Association (AIHA) accredited and that persons counting the samples have been judged proficient by current inclusion on the AIHA Asbestos Analysis Registry (AAR) and successful participation of the laboratory in the Proficiency Analytical Testing (PAT) Program. Where analysis to determine asbestos content in bulk materials or transmission electron microscopy is required, submit evidence that the laboratory is accredited by the National Institute of Science and Technology (NIST) under National Voluntary Laboratory Accreditation Program (NVLAP) for asbestos analysis. The testing laboratory firm must be independent of the asbestos contractor and must have no employee or employer relationship which could constitute a conflict of interest.

1.3.12 Landfill Approval

Submit written evidence that the landfill is approved for asbestos disposal by the U.S. Environmental Protection Agency Air Enforcement Section, and local regulatory authority. Within three working days after delivery, submit detailed delivery tickets, prepared, signed, and dated by an agent of the landfill, certifying the amount of asbestos materials delivered to the landfill. Submit a copy of the waste shipment records within one day of the shipment leaving the project site.

1.3.13 Transporter Certification

Submit written evidence that the transporter is approved to transport asbestos waste in accordance with the DOT requirements of 49 CFR 171, 49 CFR 172, 49 CFR 173, as well as registration requirements of 49 CFR 107 and all other State and local regulatory agency requirements.

1.3.14 Medical Certification

Provide a written certification for each worker and supervisor, signed by a licensed physician indicating that the worker and supervisor has met or exceeded all of the medical prerequisites listed herein and in 29 CFR 1926.1101 and 29 CFR 1926.103 as prescribed by law. Submit certificates prior to the start of work but after the main abatement submittal.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-03 Product Data

Amended Water; G

Safety Data Sheets (SDS) for All Materials; G

Encapsulants; G

Respirators; G

Local Exhaust Equipment; G

Pressure Differential Automatic Recording Instrument; G

Vacuums; G

Glovebags; G

SD-06 Test Reports

Air Sampling Results; G

Pressure Differential Recordings for Local Exhaust System; G

Clearance Sampling; G

Asbestos Disposal Quantity Report; G

SD-07 Certificates

Employee Training; G

Notifications; G

Respiratory Protection Program; G

Asbestos Hazard Abatement Plan; G

Testing Laboratory; G

Landfill Approval; G

Delivery Tickets; G

Waste Shipment Records; G

Transporter Certification; G

Medical Certification; G

Private Qualified Person Documentation; G

Designated Competent Person; G

Worker's License; G

Contractor's License; G

Federal, State or Local Citations on Previous Projects; G

Encapsulants; G

Equipment Used to Contain Airborne Asbestos Fibers; G

Water Filtration Equipment; G

Vacuums; G

Ventilation Systems; G

SD-11 Closeout Submittals

Permits and Licenses; G

Notifications; G

Respirator Program Records; G

Rental Equipment; G

1.5 QUALITY ASSURANCE

1.5.1 Private Qualified Person Documentation

Submit the name, address, and telephone number of the PQP selected to prepare the Asbestos Hazard Abatement Plan, direct monitoring and training, and documented evidence that the PQP has successfully completed training in and is accredited and where required is certified as, a Building Inspector, Contractor/Supervisor Abatement Worker, and Asbestos Project Designer as described by 40 CFR 763 and has successfully completed the National Institute of Occupational Safety and Health (NIOSH) 582 course "Sampling and Evaluating Airborne Asbestos Dust" or equivalent. The PQP must be appropriately licensed in the State of Virginia as a Project Monitor. The PQP and the asbestos contractor must not have an employee/employer relationship or financial relationship which could constitute a conflict of interest. The PQP must be a first tier subcontractor.

1.5.2 Designated Competent Person Documentation

The Designated Competent Person must be experienced in the administration and supervision of asbestos abatement projects including exposure assessment and monitoring, work practices, abatement methods, protective measures for personnel, setting up and inspecting asbestos abatement work areas, evaluating the integrity of containment barriers, placement and operation of local exhaust systems, ACM generated waste containment and disposal procedures, decontamination units installation and maintenance requirements, site safety and health requirements, notification of other employees onsite. The Designated Competent Person must be on-site at all times when asbestos abatement activities are underway.Submit training certification and a current State of Virginia Asbestos Contractor's and Supervisor's License. Submit evidence that the Designated Competent Person has a minimum of 5 years of on-the-job asbestos abatement experience relevant to OSHA designated competent person requirements. The Designated Competent Person must be a first tier subcontractor.

1.5.3 Worker's License

Submit documentation that workers meet the requirements of 29 CFR 1926.1101, 40 CFR 61-SUBPART M and have a current State of Virginia Asbestos Workers License.

1.5.4 Contractor's License

Submit a copy of the asbestos contractor's license issued by the State of

Virginia. Submit the following certification along with the license: "I certify that the personnel I am responsible for during the course of this project fully understand the contents of 29 CFR 1926.1101, 40 CFR 61-SUBPART MEM 385-1-1, and the Federal, State and local requirements for those asbestos abatement activities that they will be involved in." This certification statement must be signed by the Company's President or Chief Executive.

1.5.5 Air Sampling Results

Complete fiber counting and provide results to the PQP for review within 16 hours of the "time off" of the sample pump. Notify the Contracting Officer immediately of any airborne levels of asbestos fibers in excess of the acceptable limits. Submit sampling results to the Contracting Officer and the affected Contractor employees where required by law within three working days, signed by the testing laboratory employee performing air sampling, the employee that analyzed the sample, and the PQP. Notify the Contractor and the Contracting Officer immediately of any variance in the pressure differential which could cause adjacent unsealed areas to have asbestos fiber concentrations in excess of 0.01 fibers per cubic centimeter or background whichever is higher. In no circumstance must levels exceed 0.1 fibers per cubic centimeter.

1.5.6 Pressure Differential Recordings for Local Exhaust System

Provide a local exhaust system that creates a negative pressure of at least 0.02 inches of water relative to the pressure external to the enclosure and operate it continuously, 24-hours a day, until the temporary enclosure of the asbestos control area is removed. Submit pressure differential recordings for each work day to the PQP for review and to the Contracting Officer within 24-hours from the end of each work day.

1.5.7 Federal, State or Local Citations on Previous Projects

Submit a statement, signed by an officer of the company, containing a record of any citations issued by Federal, State or local regulatory agencies relating to asbestos activities within the last 5 years (including projects, dates, and resolutions); a list of penalties incurred through non-compliance with asbestos project specifications, including liquidated damages, overruns in scheduled time limitations and resolutions; and situations in which an asbestos-related contract has been terminated (including projects, dates, and reasons for terminations). If there are none, a negative declaration signed by an officer of the company must be provided.

1.5.8 Preconstruction Conference

Conduct a safety preconstruction conference to discuss the details of the Asbestos Hazard Abatement Plan, Accident Prevention Plan (APP) including the AHAs required in specification Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS. The safety preconstruction conference must include the Contractor and their Designated Competent Person, Designated IH and Project Supervisor and the Contracting Officer. Deficiencies in the APP must be discussed. Onsite work must not begin until the APP has been accepted.

1.6 SECURITY

A log book must be kept documenting entry into and out of the regulated

area. Entry into regulated areas must only be by personnel authorized by the Contractor and the Contracting Officer. Personnel authorized to enter regulated areas must be trained, medically evaluated, and wear the required personal protective equipment.

1.7 EQUIPMENT

1.7.1 Rental Equipment

Provide a copy of the written notification to the rental company concerning the intended use of the equipment and the possibility of asbestos contamination of the equipment.

PART 2 PRODUCTS

2.1 ENCAPSULANTS

Encapsulants must conform to current USEPA requirements, contain no toxic or hazardous substances as defined in 29 CFR 1926.59, and conform to the following performance requirements.

2.1.1 Removal Encapsulants

Requirement	Test Standard
Flame Spread - 25, Smoke Emission - 50	ASTM E84
Life Expectancy - 20 years	Warranted by the manufacturer to perform for at least 20 years as a durable barrier in the environment and conditions similar to the planned application
Permeability - Minimum 0.4 perms	ASTM E96/E96M
Fire Resistance - Negligible affect on fire resistance rating over 3 hour test (Classified by UL for use over fibrous and cementitious sprayed fireproofing)	ASTM E119
Impact Resistance - Minimum 43 in/lb	ASTM D2794 Gardner Impact Test
Flexibility - no rupture or cracking	ASTM D522/D522M Mandrel Bend Test

2.1.2 Bridging Encapsulant

Requirement	Test Standard
Flame Spread - 25, Smoke Emission - 50	ASTM E84

Requirement	Test Standard
Life Expectancy - 20 years	Warranted by the manufacturer to perform for at least 20 years as a durable barrier in the environment and conditions similar to the planned application
Permeability - Minimum 0.4 perms	ASTM E96/E96M
Fire Resistance - Negligible affect on fire resistance rating over 3-hour test (Classified by UL for use over fibrous and cementitious sprayed fireproofing)	ASTM E119
Impact Resistance - Minimum 43 in/lb	ASTM D2794 Gardner Impact Test
Flexibility - no rupture or cracking	ASTM D522/D522M Mandrel Bend Test

2.1.3 Penetrating Encapsulant

Requirement	Test Standard
Flame Spread - 25, Smoke Emission - 50	ASTM E84
Life Expectancy - 20 years	Warranted by the manufacturer to perform for at least 20 years as a durable barrier in the environment and conditions similar to the planned application
Permeability - Minimum 0.4 perms	ASTM E96/E96M
Cohesion/Adhesion Test - 50 pounds of force/foot	ASTM E119
Fire Resistance - Negligible affect on fire resistance rating over 3-hour test (Classified by UL for use over fibrous and cementitious sprayed fireproofing)	ASTM E119
Impact Resistance - Minimum 43 in/lb	ASTM D2794 Gardner Impact Test

Requirement	Test Standard
Flexibility - no rupture or cracking	ASTM D522/D522M Mandrel Bend Test

2.1.4 Lock-down Encapsulant

Requirement	Test Standard
Flame Spread - 25, Smoke Emission - 50	ASTM E84
Life Expectancy - 20 years	Warranted by the manufacturer to perform for at least 20 years as a durable barrier in the environment and conditions similar to the planned application
Permeability - Minimum 0.4 perms	ASTM E96/E96M
Fire Resistance - Negligible affect on fire resistance rating over 3-hour test (Tested with fireproofing over encapsulant applied directly to steel member)	ASTM E119
Bond Strength: 100 pounds of force/foot	ASTM E736/E736M
(Tests compatibility with cementitious and fibrous fireproofing)	

2.2 DUCT TAPE

Industrial grade duct tape of appropriate widths suitable for bonding sheet plastic and disposal container.

2.3 DISPOSAL CONTAINERS

Leak-tight (defined as solids, liquids, or dust that cannot escape or spill out) disposal containers must be provided for ACM wastes, and presumed ACM wastes, as required by 29 CFR 1926.1101 and state and local regulatory requirements. Disposal containers can be in the form of:

a. Disposal Bags

b. Fiberboard Drums

c. Cardboard Boxes

2.4 SHEET PLASTIC

Sheet plastic must be polyethylene of 6 mil minimum thickness and must be

provided in the largest sheet size necessary to minimize seams. Film must be clear and conform to ASTM D4397, except as specified below

2.4.1 Flame Resistant

Where a potential for fire exists, flame-resistant sheets must be provided. Film must be frosted or black and must conform to the requirements of NFPA 701.

2.4.2 Reinforced

Reinforced sheets must be provided where high skin strength is required, such as where it constitutes the only barrier between the regulated area and the outdoor environment. The sheet stock must consist of translucent, nylon-reinforced or woven-polyethylene thread laminated between two layers of polyethylene film. Film must meet flame resistant standards of NFPA 701.

2.5 MASTIC REMOVING SOLVENT

Mastic removing solvent must be nonflammable and must not contain methylene chloride, glycol ether, or halogenated hydrocarbons. Solvents used onsite must have a flash point greater than 140 degrees F.

Prior to approving the use of mastic removing solvent for renovation projects where a new material is placed on the treated surface, the treated surface with mastic removing solvent must be completely removed. Remaining mastic removing solvent may react with glues and mastic of the new product.

2.6 LEAK-TIGHT WRAPPING

Two layers of 6 mil minimum thick polyethylene sheet stock must be used for the containment of removed asbestos-containing components or materials such as large tanks, boilers, insulated pipe segments and other materials. Upon placement of the ACM component or material, each layer must be individually leak-tight sealed with duct tape.

2.7 VIEWING INSPECTION WINDOW

Where feasible, a minimum of one clear, 1/8 inch thick, acrylic sheet, 18 by 24 inches, must be installed as a viewing inspection window at eye level on a wall in each containment enclosure. The windows must be sealed leak-tight with industrial grade duct tape.

2.8 WETTING AGENTS

Removal encapsulant (a penetrating encapsulant) must be provided when conducting removal abatement activities that require a longer removal time or are subject to rapid evaporation of amended water. The removal encapsulant must be capable of wetting the ACM and retarding fiber release during disturbance of the ACM greater than or equal to that provided by amended water. Performance requirements for penetrating encapsulants are specified in paragraph ENCAPSULANTS above.

PART 3 EXECUTION

3.1 EQUIPMENT

Provide the Contracting Officer or the Contracting Officer's

Representative, with at least two complete sets of personal protective equipment as required for entry to and inspection of the asbestos control area. Provide equivalent training to the Contracting Officer or a designated representative as provided to Contractor employees in the use of the required personal protective equipment. Provide manufacturer's certificate of compliance for all equipment used to contain airborne asbestos fibers.

3.1.1 Air Monitoring Equipment

The Contractor's PQP must approve air monitoring equipment. The equipment must include, but must not be limited to:

a. High-volume sampling pumps that can be calibrated and operated at a constant airflow up to 16 liters per minute.

b. Low-volume, battery powered, body-attachable, portable personal pumps that can be calibrated to a constant airflow up to approximately 3.5 liters per minute, and a self-contained rechargeable power pack capable of sustaining the calibrated flow rate for a minimum of 10 hours. The pumps must also be equipped with an automatic flow control unit which must maintain a constant flow, even as filter resistance increases due to accumulation of fiber and debris on the filter surface.

c. Single use standard 25 mm diameter cassette, open face, 0.8 micron pore size, mixed cellulose ester membrane filters and cassettes with 50 mm electrically conductive extension cowl, and shrink bands for personal air sampling.

d. Single use standard 25 mm diameter cassette, open face, 0.45 micron pore size, mixed cellulose ester membrane filters and cassettes with 50 mm electrically conductive cowl, and shrink bands when conducting environmental area sampling using NIOSH NMAM Methods 7400 and 7402, (and the transmission electric microscopy method specified at 40 CFR 763 if required).

e. A flow calibrator capable of calibration to within plus or minus 2 percent of reading over a temperature range of minus 4 to plus 140 degrees F and traceable to a NIST primary standard.

3.1.2 Respirators

Select respirators from those approved by the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services.

3.1.2.1 Respirators for Handling Asbestos

Provide personnel engaged in pre-cleaning, cleanup, handling, removal of asbestos materials with respiratory protection as indicated in 29 CFR 1926.1101 and 29 CFR 1926.103. Breathing air must comply with CGA G-7.

3.1.3 Exterior Whole Body Protection

3.1.3.1 Outer Protective Clothing

Provide personnel exposed to asbestos with disposable "non-breathable,"

whole body outer protective clothing, head coverings, gloves, and foot coverings. Provide disposable plastic or rubber gloves to protect hands. Cloth gloves may be worn inside the plastic or rubber gloves for comfort, but must not be used alone. Make sleeves secure at the wrists, make foot coverings secure at the ankles, and make clothing secure at the neck by the use of tape.

3.1.3.2 Work Clothing

Provide cloth work clothes for wear under the outer protective clothing and foot coverings and either dispose of or properly decontaminate them as recommended by the PQP after each use.

3.1.3.3 Personal Decontamination Unit

Provide a temporary, negative pressure unit with a separate decontamination locker room and clean locker room with a shower that complies with 29 CFR 1926.51(f)(4)(ii) through (V) in between for personnel required to wear whole body protective clothing. Provide two separate lockers for each asbestos worker, one in each locker room. Keep street clothing and street shoes in the clean locker. HEPA vacuum and remove asbestos contaminated disposable protective clothing while still wearing respirators at the boundary of the asbestos work area and seal in impermeable bags or containers for disposal. Do not wear work clothing between home and work. Locate showers between the decontamination locker room and the clean locker room and require that all employees shower before changing into street clothes. Collect used shower water and filter with approved water filtration equipment to remove asbestos contamination. Wastewater filters must be installed in series with the first stage pore size 20 microns and the second stage pore size of 5 microns. Dispose of filters and residue as asbestos waste. Discharge clean water to the sanitary system. Dispose of asbestos contaminated work clothing as asbestos contaminated waste. Keep the floor of the decontamination unit's clean room dry and clean at all times. Proper housekeeping and hygiene requirements must be maintained. Provide soap and towels for showering, washing and drying. Cloth towels provided must be disposed of as ACM waste. Physically attach the decontamination units to the asbestos control area. Construct both a personnel decontamination unit and an equipment decontamination unit onto and integral with each asbestos control area.

3.1.3.4 Eye Protection

Provide eye protection that complies with ANSI/ISEA Z87.1 when operations present a potential eye injury hazard. Provide goggles to personnel engaged in asbestos abatement operations when the use of a full face respirator is not required.

3.1.4 Regulated Areas

All Class I, II, and III asbestos work must be conducted within regulated areas. The regulated area must be demarcated to minimize the number of persons within the area and to protect persons outside the area from exposure to airborne asbestos. Control access to regulated areas, ensure that only authorized personnel enter, and verify that Contractor required medical surveillance, training and respiratory protection program requirements are met prior to allowing entrance.

3.1.5 Load-out Unit

Provide a temporary load-out unit that is adjacent and connected to the regulated area. Attach the load-out unit in a leak-tight manner to each regulated area.

3.1.6 Warning Signs and Labels

Provide bilingual warning signs printed in English and Spanish at all approaches to asbestos control areas. Locate signs at such a distance that personnel may read the sign and take the necessary protective steps required before entering the area. Provide labels and affix to all asbestos materials, scrap, waste, debris, and other products contaminated with asbestos. Containers with preprinted warning labels conforming to the requirements are acceptable

3.1.6.1 Warning Sign

Provide vertical format conforming to 29 CFR 1926.200, and 29 CFR 1926.1101 minimum 20 by 14 inches displaying the following legend in the lower panel:

Legend	Notation
DANGER	one inch Sans Serif Gothic or Block
ASBESTOS	one inch Sans Serif Gothic or Block
MAY CAUSE CANCER	one inch Sans Serif Gothic or Block
CAUSES DAMAGE TO LUNGS	1/4 inch Sans Serif Gothic or Block
AUTHORIZED PERSONNEL ONLY	1/4 inch Sans Serif Gothic or Block
~~[~~WEAR RESPIRATORY PROTECTION AND PROTECTIVE CLOTHING IN THIS AREA~~]~~	1/4 inch Sans Serif Gothic or Block

Spacing between lines must be at least equal to the height of the upper of any two lines.

3.1.6.2 Warning Labels

Provide labels conforming to 29 CFR 1926.1101 of sufficient size to be clearly legible, displaying the following legend:

DANGER
CONTAINS ASBESTOS FIBERS

MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
DO NOT BREATHE DUST AVOID CREATING DUST

3.1.7 Local Exhaust System

Provide a local exhaust system in the asbestos control area in accordance with ASSP Z9.2 and 29 CFR 1926.1101 that provides at least four air changes per hour inside of the negative pressure enclosure. Local exhaust equipment must be operated 24-hours per day, until the asbestos control area is removed and must be leak proof to the filter and equipped with HEPA filters. Maintain a minimum pressure differential in the control area of minus 0.02 inch of water column relative to adjacent, unsealed areas. Provide continuous 24-hour per day monitoring of the pressure differential with a pressure differential automatic recording instrument. The building ventilation system must not be used as the local exhaust system for the asbestos control area. Filters on exhaust equipment must conform to ASSP Z9.2 and UL 586. Terminate the local exhaust system out of doors and remote from any public access or ventilation system intakes.

3.1.8 Tools

Vacuums must be leak proof to the filter and equipped with HEPA filters. Filters on vacuums must conform to ASSP Z9.2 and UL 586. Do not use power tools to remove asbestos containing materials unless the tool is equipped with effective, integral HEPA filtered exhaust ventilation systems. Remove all residual asbestos from reusable tools prior to storage or reuse. Reusable tools must be thoroughly decontaminated prior to being removed from the regulated areas.

3.1.9 Rental Equipment

If rental equipment is to be used, furnish written notification to the rental agency concerning the intended use of the equipment and the possibility of asbestos contamination of the equipment.

3.1.10 Glovebags

Submit written manufacturers proof that glovebags do not break down under expected temperatures and conditions.

3.1.11 Single Stage Decontamination Area

A decontamination area (equipment room/area) must be provided for Class I work involving less than 25 feet or 10 square feet of TSI or surfacing ACM, and for Class II and Class III asbestos work operations where exposures exceed the PELs or where there is no negative exposure assessment. The equipment room or area must be adjacent to the regulated area for the decontamination of employees, material, and their equipment which could be contaminated with asbestos. The area must be covered by an impermeable drop cloth on the floor or horizontal working surface. The area must be of sufficient size to accommodate cleaning of equipment and removing personal protective equipment without spreading contamination beyond the area.

3.1.12 Decontamination Area Exit Procedures

Ensure that the following procedures are followed:

a. Before leaving the regulated area, remove all gross contamination and debris from work clothing using a HEPA vacuum.

b. Employees must remove their protective clothing in the equipment room and deposit the clothing in labeled impermeable bags or containers for disposal.

c. Employees must not remove their respirators until showering.

d. Employees must shower prior to entering the clean room. If a shower has not been located between the equipment room and the clean room or the work is performed outdoors, ensure that employees engaged in Class I asbestos jobs: a) Remove asbestos contamination from their work suits in the equipment room or decontamination area using a HEPA vacuum before proceeding to a shower that is not adjacent to the work area; or b) Remove their contaminated work suits in the equipment room, without cleaning worksuits, and proceed to a shower that is not adjacent to the work area.

3.2 WORK PROCEDURE

Perform asbestos related work in accordance with 29 CFR 1926.1101, 40 CFR 61-SUBPART M, NAVFAC P-502, and as specified herein. Use wet removal procedures and negative pressure enclosure techniques. Wear and utilize protective clothing and equipment as specified herein. No eating, smoking, drinking, chewing gum, tobacco, or applying cosmetics is permitted in the asbestos work or control areas. Personnel of other trades not engaged in the removal and demolition of asbestos containing material must not be exposed at any time to airborne concentrations of asbestos unless all the personnel protection and training provisions of this specification are complied with by the trade personnel. Seal all roof top penetrations, except plumbing vents, prior to asbestos roofing work. Shut down the building heating, ventilating, and air conditioning system, cap the openings to the system, and provide temporary heating, and ventilation, and air conditioning prior to the commencement of asbestos work. Power to the regulated area must be locked-out and tagged in accordance with 29 CFR 1910.147. Disconnect electrical service when wet removal is performed and provide temporary electrical service with verifiable ground fault circuit interrupter (GFCI) protection prior to the use of any water. All electrical work must be performed by a licensed electrician. Stop abatement work in the regulated area immediately when the airborne total fiber concentration: (1) equals or exceeds 0.01 f/cc, or the pre-abatement concentration, whichever is greater, outside the regulated area; or (2) equals or exceeds 1.0 f/cc inside the regulated area. Correct the condition to the satisfaction of the Contracting Officer, including visual inspection and air sampling. Work must resume only upon notification by the Contracting Officer. Corrective actions must be documented. If an asbestos fiber release or spill occurs outside of the asbestos control area, stop work immediately, correct the condition to the satisfaction of the Contracting Officer including clearance sampling, prior to resumption of work.

3.2.1 Building Ventilation System and Critical Barriers

Building ventilation system supply and return air ducts in a regulated

area must be shut down and isolated by lockable switch or other positive means in accordance with 29 CFR 1910.147. The airtight seals must consist of air-tight rigid covers for building ventilation supply and exhaust grills where the ventilation system is required to remain in service during abatement, two layers of polyethylene. Edges to wall, ceiling and floor surfaces must be sealed with industrial grade duct tape.

a. A Competent Person must supervise the work.

b. For indoor work, critical barriers must be placed over all openings to the regulated area.

c. Impermeable dropcloths must be placed on surfaces beneath all removal activity.

3.2.2 Protection of Existing Work to Remain

Perform work without damage or contamination of adjacent work. Where such work is damaged or contaminated as verified by the Contracting Officer using visual inspection or sample analysis, it must be restored to its original condition or decontaminated by the Contractor as deemed appropriate by the Contracting Officer. This includes inadvertent spill of dirt, dust, or debris in which it is reasonable to conclude that asbestos may exist. When these spills occur, stop work immediately. Then clean up the spill. When satisfactory visual inspection and air sampling results are obtained from the PQP work may proceed at the discretion of the Contracting Officer.

3.2.3 Furnishings

Furniture and equipment will be removed from the area of work by the Government before asbestos work begins.

3.2.4 Precleaning

Wet wipe and HEPA vacuum all surfaces potentially contaminated with asbestos prior to establishment of an enclosure.

3.2.5 Asbestos Control Area Requirements

3.2.5.1 Negative Pressure Enclosure

Removal of asbestos contaminated acoustical ceiling tiles, spray applied fireproofing, thermal system insulation, gypsum wallboard/joint compound and all other asbestos-containing materials require the use of a negative pressure enclosure. Block and seal openings in areas where the release of airborne asbestos fibers can be expected. Establish an asbestos negative pressure enclosure with the use of curtains, portable partitions, or other enclosures in order to prevent the escape of asbestos fibers from the contaminated asbestos work area. Negative pressure enclosure development must include protective covering of uncontaminated walls, and ceilings with a continuous membrane of two layers of minimum 6-mil plastic sheet sealed with tape to prevent water or other damage. Provide two layers of 6-mil plastic sheet over floors and extend a minimum of 12 inches up walls. Seal all joints with tape. Provide local exhaust system in the asbestos control area. Openings are allowed in enclosures of asbestos control areas for personnel and equipment entry and exit, the supply and exhaust of air for the local exhaust system and the removal of properly containerized asbestos containing materials. Replace local exhaust system

filters as required to maintain the efficiency of the system.

3.2.5.2 Glovebag

If the construction of a negative pressure enclosure is infeasible for the removal of asbestos-containing materials, alternate techniques must be approved by the Contracting Officer. Use alternate techniques as indicated in 29 CFR 1926.1101. Establish designated limits for the asbestos regulated area with the use of rope or other continuous barriers, and maintain all other requirements for asbestos control areas. The PQP must conduct personal samples of each worker engaged in asbestos handling (removal, disposal, transport and other associated work) throughout the duration of the project. If the quantity of airborne asbestos fibers monitored at the breathing zone of the workers at any time exceeds background or 0.01 fibers per cubic centimeter whichever is greater, stop work, evacuate personnel in adjacent areas or provide personnel with approved protective equipment at the discretion of the Contracting Officer. This sampling may be duplicated by the Government at the discretion of the Contracting Officer. If the air sampling results obtained by the Government differ from those obtained by the Contractor, the Government will determine which results predominate. If adjacent areas are contaminated as determined by the Contracting Officer, clean the contaminated areas, monitor, and visually inspect the area as specified herein.

3.2.5.3 Regulated Area for Class II Removal

Removal of asbestos containing floor tile/mastic, carpet/mastic, sealants, are Class II removal activities. Establish designated limits for the asbestos regulated work area with the use of red barrier tape; install critical barriers, splash guards and signs, and maintain all other requirements for asbestos control area except local exhaust. Place impermeable dropcloths on surfaces beneath removal activity extending out 3 feet in all directions. A detached decontamination system may be used. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.6 Removal Procedures

Wet asbestos material with a fine spray of amended water during removal, cutting, or other handling so as to reduce the emission of airborne fibers. Remove material and immediately place in 6 mil plastic disposal bags. Remove asbestos containing material in a gradual manner, with continuous application of the amended water or wetting agent in such a manner that no asbestos material is disturbed prior to being adequately wetted. Where unusual circumstances prohibit the use of 6 mil plastic bags, submit an alternate proposal for containment of asbestos fibers to the Contracting Officer for approval. For example, in the case where both piping and insulation are to be removed, the Contractor may elect to wet the insulation, wrap the pipes and insulation in plastic and remove the pipe by sections. Containerize asbestos containing material while wet. Do not allow asbestos material to accumulate or become dry. Lower and otherwise handle asbestos containing material as indicated in 40 CFR 61-SUBPART M.

3.2.6.1 Sealing Contaminated Items Designated for Disposal

Remove contaminated architectural, mechanical, and electrical appurtenances such as venetian blinds, full-height partitions, carpeting, duct work, pipes and fittings, radiators, light fixtures, conduit, panels, and other contaminated items designated for removal by completely coating the items with an asbestos lock-down encapsulant at the demolition site before removing the items from the asbestos control area. These items need not be vacuumed. The asbestos lock-down encapsulant must be tinted a contrasting color and spray-applied by airless method. Thoroughness of sealing operation must be visually gauged by the extent of colored coating on exposed surfaces. Lock-down encapsulants must comply with the performance requirements specified herein.

3.2.6.2 Exposed Pipe Insulation Edges

Contain edges of asbestos insulation to remain that are exposed by a removal operation. Wet and cut the rough ends true and square with sharp tools and then encapsulate the edges with a 1/4 inch thick layer of non-asbestos containing insulating cement troweled to a smooth hard finish. When cement is dry, lag the end with a layer of non-asbestos lagging cloth, overlapping the existing ends by at least 4 inches. When insulating cement and cloth is an impractical method of sealing a raw edge of asbestos, take appropriate steps to seal the raw edges as approved by the Contracting Officer.

3.2.6.3 Presumed ACM

Presumed ACM must be treated as ACM throughout the abatement and disposal process. Testing can be performed by a trained and certified asbestos professional following applicable local, state, and federal regulations to either confirm the material is ACM or non-ACM. If testing proves asbestos is not present, the material can be managed as non-ACM.

3.2.7 Methods of Compliance

3.2.7.1 Mandated Practices

The specific abatement techniques and items identified must be detailed in the Contractor's Asbestos Hazard Abatement Plan (AHAP). Use the following engineering controls and work practices in all operations, regardless of the levels of exposure:

a. Vacuum cleaners equipped with HEPA filters.

b. Wet methods or wetting agents except where it can be demonstrated that the use of wet methods is unfeasible due to the creation of electrical hazards, equipment malfunction, and in roofing.

c. Prompt clean-up and disposal.

d. Inspection and repair of polyethylene.

e. Cleaning of equipment and surfaces of containers prior to removing them from the equipment room or area.

3.2.7.2 Control Methods

Use the following control methods:

a. Local exhaust ventilation equipped with HEPA filter;

b. Enclosure or isolation of processes producing asbestos dust;

c. Where the feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the PELs, use them to reduce employee exposure to the lowest levels attainable and must supplement them by the use of respiratory protection.

3.2.7.3 Unacceptable Practices

The following work practices must not be used:

a. High-speed abrasive disc saws that are not equipped with point of cut ventilator or enclosures with HEPA filtered exhaust air.

b. Compressed air used to remove asbestos containing materials, unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud created by the compressed air.

c. Dry sweeping, shoveling, or other dry clean up.

d. Employee rotation as a means of reducing employee exposure to asbestos.

3.2.8 Class I Work Procedures

In addition to requirements of paragraphs MANDATED PRACTICES and CONTROL METHODS, the following engineering controls and work practices must be used:

a. A Competent Person must supervise the installation and operation of the control methods.

b. For jobs involving the removal of more than 25 feet or 10 square feet of TSI or surfacing material, place critical barriers over all openings to the regulated area.

c. HVAC systems must be isolated in the regulated area by sealing with a double layer of plastic or air-tight rigid covers.

d. Impermeable dropcloths (6 mil or greater thickness) must be placed on surfaces beneath all removal activity.

e. Where a negative exposure assessment has not been provided or where exposure monitoring shows the PEL was exceeded, the regulated area must be ventilated with a HEPA unit and employees must use PPE.

3.2.9 Specific Control Methods for Class I Work

Use Class I work procedures, control methods and removal methods for the following ACM:

a. Spray Applied Fireproofing

b. Gypsum Wallboard and Joint Compound

c. Thermal System Insulation and Mudded Pipe Fittings

d. Plaster and Textured Ceilings and Walls

e. Vermiculite insulation

3.2.9.1 Negative Pressure Enclosure (NPE) System

The system must provide at least four air changes per hour inside the containment. The local exhaust unit equipment must be operated 24-hours per day until the containment is removed. The NPE must be smoke tested for leaks at the beginning of each shift and be sufficient to maintain a minimum pressure differential of minus 0.02 inch of water column relative to adjacent, unsealed areas. Pressure differential must be monitored continuously, 24-hours per day, with an automatic manometric recording instrument and records must be provided daily on the same day collected to the Contracting Officer. The Contracting Officer must be notified immediately if the pressure differential falls below the prescribed minimum. The building ventilation system must not be used as the local exhaust system for the regulated area. The NPE must terminate outdoors unless an alternate arrangement is allowed by the Contracting Officer. All filters used must be new at the beginning of the project and must be periodically changed as necessary and disposed of as ACM waste.

3.2.9.2 Glovebag Systems

Glovebags must be used without modification, smoke-tested for leaks, and completely cover the circumference of pipe or other structures where the work is to be done. Glovebags must be used only once and must not be moved. Glovebags must not be used on surfaces that have temperatures exceeding 150 degrees F. Prior to disposal, glovebags must be collapsed using a HEPA vacuum. Before beginning the operation, loose and friable material adjacent to the glovebag operation must be wrapped and sealed in two layers of plastic or otherwise rendered intact. At least two persons must perform glovebag removal. Asbestos regulated work areas must be established for glovebag abatement. Designated boundary limits for the asbestos work must be established with rope or other continuous barriers and all other requirements for asbestos control areas must be maintained, including area signage and boundary warning tape.

a. Attach HEPA vacuum systems to the bag to prevent collapse during removal of ACM.

b. The negative pressure glove boxes must be fitted with gloved apertures and a bagging outlet and constructed with rigid sides from metal or other material which can withstand the weight of the ACM and water used during removal. A negative pressure must be created in the system using a HEPA filtration system. The box must be smoke tested for leaks prior to each use.

3.2.9.3 Mini-Enclosure

Double bulkhead containment or Mini-containment (small walk-in enclosure) to accommodate no more than two persons, may be used if the disturbance or removal can be completely contained by the enclosure. The mini-enclosure must be inspected for leaks and smoke tested before each use. Air movement must be directed away from the employee's breathing zone within the mini-enclosure.

3.2.9.4 Wrap and Cut Operation

Prior to cutting pipe, the asbestos-containing insulation must be wrapped with polyethylene and securely sealed with duct tape to prevent asbestos becoming airborne as a result of the cutting process. The following steps must be taken: install glovebag, strip back sections to be cut 6 inches from point of cut, and cut pipe into manageable sections.

3.2.9.5 Class I Removal Method

Class I ACM must be removed using a control method described above. Prepare work area as previously specified. Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area. Spread one layer of 6-mil seamless plastic sheeting on the floor below the work area. Remove asbestos containing spray applied fireproofing using a scraper and wet methods and immediately place into 6-mil thickness disposal bag. After removal of the material use a wire brush to clean the exposed substrate to remove residual material. Continue wet cleaning until surfaces are free of visible debris. Cut manageable sections of gypsum wallboard and joint compound and immediately place into a 6-mil minimum thickness disposal bag or other approved container. Make every effort to keep the material from falling to the floor of the work area. Use a wire brush and wet clean to remove residual material from studs. Continue wet cleaning until the surface is clean of visible material and encapsulate stud walls. Remove ACM thermal system insulation and mudded pipe fittings using mechanical means and wet methods and immediately place into 6-mil thickness disposal bag. Continue wet cleaning until surfaces are free of visible debris. Remove ACM plaster ceilings or walls using mechanical means and adequately wet methods and immediately place into 6-mil thickness disposal bag. Make every effort to keep the material from falling to the floor of the work area. Continue wet cleaning until surfaces are free of visible debris. Remove ACM textured ceiling finish using a scraper and wet methods and immediately place into 6-mil thickness disposal bag. Floors are considered contaminated from fallen textured ceiling finish. Clean up debris on floor and dispose of carpet as asbestos contaminated material. After removal of the material use a wire brush to clean the exposed concrete ceiling to remove residual material. Continue wet cleaning until surfaces are free of visible debris. Remove ACM vermiculite using mechanical means and adequately wet methods and immediately place into 6-mil thickness disposal bag. Make every effort to keep the material from falling to the floor of the work area. Continue wet cleaning until surfaces are free of visible debris. Bag all asbestos debris which has fallen to the floor as asbestos-containing debris. Place all debris in plastic disposal bags of 6-mil minimum thickness. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duct tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Lower and otherwise handle asbestos containing materials as indicated in 40 CFR 61-SUBPART M. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the quantity of airborne asbestos fibers monitored at the breathing zone of the workers or the designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work, and immediately correct the situation.

3.2.10 Class II Work Procedures

In addition to the requirements of paragraphs MANDATED PRACTICES and CONTROL METHODS, the following engineering controls and work practices must be used:

a. A Competent Person must supervise the work.

b. For indoor work, critical barriers must be placed over all openings to the regulated area.

c. Impermeable dropcloths must be placed on surfaces beneath all removal activity.

3.2.11 Specific Control Methods for Class II Work

3.2.11.1 Vinyl and Asphaltic Flooring Materials, Carpet and Mastic

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. A detached decontamination system may be used. When removing vinyl floor tile and mastic, carpet and mastic which contains ACM, use the following practices. Remove floor tile and mastic, carpet and mastic using adequately wet methods. Remove floor tiles, carpet and mastic intact (if possible). Wetting is not required when floor tiles are heated and removed intact. Do not sand flooring or its backing. Scrape residual adhesive and backing using wet methods. Mechanical chipping is prohibited unless performed in a negative pressure enclosure. Dry sweeping is prohibited. Use vacuums equipped with HEPA filter, disposable dust bag, and metal floor tool (no brush) to clean floors. Place debris into a 6-mil minimum thickness disposal bag or other approved container. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duct tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Lower and otherwise handle asbestos containing materials as indicated in 40 CFR 61-SUBPART M. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.11.2 Sealants and Mastic

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers and signs, and maintain all other requirements for asbestos control area except local exhaust. Spread 6-mil plastic sheeting on the ground around the perimeter of the work area extending out in all directions. Using adequately wet methods, carefully remove the ACM sealants and mastics using a scraper of knife blade. As it is removed place the material into a disposal bag. Make every effort to keep the asbestos material from falling to the ground or work area floor below. Dry sweeping is prohibited. Use vacuums equipped with HEPA filter and disposable dust bag. Place debris into a 6-mil minimum thickness

disposal bag or other approved container. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duct tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Lower and otherwise handle asbestos containing materials as indicated in 40 CFR 61-SUBPART M. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or at designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.11.3 Suspect Fire Doors

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. A detached decontamination system may be used. Spread 6-mil plastic sheeting on the ground beneath the work area and around the perimeter of the work area extending out in all directions. Remove door intact from hinges and wrap with 6-mil plastic sheeting. Inspect the interior areas of the door to determine if ACM is present. If ACM is not present the door may be disposed of as general construction debris. If ACM is present place whole door in enclosed container for disposal. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.11.4 Roofing Materials

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. When removing roofing materials which contain ACM as described in 29 CFR 1926.1101(g)(8)(ii), use the following practices. Roofing material must be removed in an intact state. Wet methods must be used to remove roofing materials that are not intact, or to be rendered not intact during removal, unless such wet methods are not feasible or create safety hazards. When removing built-up roofs, with asbestos-containing roofing felts and an aggregate surface, using a power roof cutter, all dust resulting from the cutting operations must be collected by a HEPA dust collector, or must be HEPA vacuumed by vacuuming along the cut line. Asbestos-containing roofing material must not be dropped or thrown to the ground, but must be lowered to the ground via covered, dust-tight chute, crane, hoist or other method approved by the Contracting Officer. Any ACM that is not intact must be lowered to the ground as soon as practicable, but not later than the end of the work shift. While the material remains on the roof it must be kept wet or placed in an impermeable waste bag or wrapped in plastic sheeting. Intact ACM must be lowered to the ground as soon as practicable, but not later than the end of the work shift. Unwrapped material must be transferred to a closed receptacle. Critical barriers must be placed over roof level heating and ventilation air intakes. Conduct area monitoring of airborne fibers during the work shift

at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.11.5 Cementitious Siding and Shingles or Transite Panels

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. When removing cementitious asbestos-containing siding, shingles or Transite panels use the following work practices. Intentionally cutting, abrading or breaking is prohibited. Each panel or shingle must be sprayed with amended water or wetting agent prior to removal. Nails must be cut with flat, sharp instruments. Unwrapped or unbagged panels or shingles must be immediately lowered to the ground via covered dust-tight chute, crane or hoist, or placed in an impervious waste bag or wrapped in plastic sheeting and lowered to the ground no later than the end of the work shift. Place debris into a 6-mil minimum thickness disposal bag or other approved container. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duct tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.11.6 Gaskets

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. Gaskets must be thoroughly wetted with amended water or wetting agent prior to removal and immediately placed in a disposal container. If a gasket is visibly deteriorated and unlikely to be removed intact, removal must be undertaken within a glovebag. Any scraping to remove residue must be performed wet. Place debris into a 6-mil minimum thickness disposal bag or other approved container. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duct tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.12 Abatement of Asbestos Contaminated Soil

Establish designated limits for the asbestos regulated work area with the

use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. Asbestos contaminated soil must be removed from areas to a minimum depth of 2 inches. Abatement of asbestos contaminated soil must be performed in accordance with all federal, state, and local regulations. Soil must be thoroughly dampened with amended water and then removed by manual shoveling into labeled containers. Place debris into a 6-mil minimum thickness disposal bag or other approved container. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duct tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.13 Air Sampling

Perform sampling of airborne concentrations of asbestos fibers in accordance with 29 CFR 1926.1101, the Contractor's air monitoring plan, applicable local, state and federal regulations, and as specified herein. Sampling performed in accordance with 29 CFR 1926.1101 must be performed by the PQP. Sampling performed for environmental and quality control reasons must be performed by the PQP. Unless otherwise specified, use NIOSH Method 7400 for sampling and analysis. Monitoring may be duplicated by the Government at the discretion of the Contracting Officer. If the air sampling results obtained by the Government differ from those results obtained by the Contractor, the Government will determine which results predominate. Results of breathing zone samples must be made available to the tested employees and Contracting Officer.. Submit all documentation regarding initial exposure assessments, negative exposure assessments, and air-monitoring results.

3.2.13.1 Sampling Prior to Asbestos Work

Provide area air sampling and establish the baseline one day prior to the masking and sealing operations for each removal site. Establish the background by performing area sampling in similar but uncontaminated sites in the building.

3.2.13.2 Sampling During Asbestos Work

The PQP must provide personal and area sampling as indicated in 29 CFR 1926.1101 and governing environmental regulations. Breathing zone samples must be taken for at least 25 percent of the workers in each shift, or a minimum of two, whichever is greater. Air sample fiber counting must be completed and results provided within 24-hours (breathing zone samples), and 12 hours (environmental/clearance monitoring) after completion of a sampling period. In addition, provided the same type of work is being performed, provide area sampling at least once every work shift close to the work inside the enclosure, outside the clean room entrance to the enclosure, and at the exhaust opening of the local exhaust system. If sampling outside the enclosure shows airborne levels have exceeded background or 0.01 fibers per cubic centimeter, whichever is greater, stop all work, correct the condition(s) causing the increase, and

notify the Contracting Officer immediately. Where alternate methods are used, perform personal and area air sampling at locations and frequencies that accurately characterize the evolving airborne asbestos levels. The written results must be signed by testing laboratory analyst, testing laboratory principal and the Contractor's PQP. The air sampling results must be documented on a Contractor's daily air monitoring log.

The PQP must provide personal sampling as indicated in 29 CFR 1926.1101. Breathing zone samples must be taken for at least 25 percent of the workers in each shift, or a minimum of two, whichever is greater. Breathing zone samples must be taken for at least 25 percent of the workers in each shift, or a minimum of two, whichever is greater. Air sample fiber counting must be completed and results provided within 24-hours (breathing zone samples), and 16 hours (environmental/clearance monitoring) after completion of a sampling period. At the same time the PQP must provide area sampling close to the work inside the enclosure, outside the clean room entrance to the enclosure, and at the exhaust opening of the local exhaust system. In addition, provided the same type of work is being performed, the PQP must provide area sampling once every work shift close to the work inside the enclosure, outside the clean room entrance to the enclosure, and at the exhaust opening of the local exhaust system. If sampling outside the enclosure shows airborne levels have exceeded background or 0.01 fibers per cubic centimeter, whichever is greater, stop all work, correct the condition(s) causing the increase, and notify the Contracting Officer immediately. Where alternate methods are used, perform personal and area air sampling at locations and frequencies that accurately characterize the evolving airborne asbestos levels. The written results must be signed by testing laboratory analyst, testing laboratory principal and the Contractor's PQP. The air sampling results must be documented on a Contractor's daily air monitoring log.

3.2.13.3 Final Clearance Requirements, NIOSH PCM Method

For PCM sampling and analysis using NIOSH NMAM Method 7400, the fiber concentration inside the abated regulated area, for each airborne sample, must be less than 0.01 f/cc. The abatement inside the regulated area is considered complete when every PCM final clearance sample is below the clearance limit. If any sample result is greater than 0.01 total f/cc, the asbestos fiber concentration (asbestos f/cc) must be confirmed from that same filter using NIOSH NMAM Method 7402 (TEM) at no additional cost to the Government. If any confirmation sample result is greater than 0.01 asbestos f/cc, abatement is incomplete and cleaning must be repeated at no additional cost to the Government. Upon completion of any required recleaning, resampling with results to meet the above clearance criteria must be done at no additional cost to the Government.

3.2.13.4 Final Clearance Requirements, EPA TEM Method

For EPA TEM sampling and analysis, using the EPA Method specified in 40 CFR 763, abatement inside the regulated area is considered complete when the arithmetic mean asbestos concentration of the five inside samples is less than or equal to 70 structures per square millimeter (70 S/mm). When the arithmetic mean is greater than 70 S/mm, the three blank samples must be analyzed. If the three blank samples are greater than 70 S/mm, resampling must be done. If less than 70 S/mm, the five outside samples must be analyzed and a Z-test analysis performed. When the Z-test results are less than 1.65, the decontamination must be considered complete. If the Z-test results are more than 1.65, the abatement is incomplete and cleaning must be repeated. Upon completion of any required recleaning,

resampling with results to meet the above clearance criteria must be done at no additional cost to the Government.

3.2.13.5 Sampling After Final Clean-Up (Clearance Sampling)

Provide area sampling of asbestos fibers using aggressive air sampling techniques as defined in the EPA 560/5-85-024 and establish an airborne asbestos concentration of less than 0.01 fibers per cubic centimeter after final clean-up but before removal of the enclosure or the asbestos work control area. After final cleanup and the asbestos control area is dry but prior to clearance sampling, the PQP must perform a visual inspection in accordance with ASTM E1368 to ensure that the asbestos control and work area is free of any accumulations of dirt, dust, or debris. Prepare a written report signed and dated by the PQP documenting that the asbestos control area is free of dust, dirt, and debris and all waste has been removed. Use transmission electron microscopy (TEM) where required by the State of Virginia to analyze clearance samples and report the results in accordance with current NIOSH criteria. The asbestos fiber counts from these samples must be less than 0.01 fibers per cubic centimeter or be not greater than the background, whichever is greater. If any of the final samples indicate a higher value take appropriate actions to re-clean the area and repeat the sampling and TEM analysis at no additional cost to the Government.

3.2.13.6 Air Clearance Failure

If clearance sampling results fail to meet the final clearance requirements, pay all costs associated with the required recleaning, resampling, and analysis, until final clearance requirements are met.

3.2.14 Lock-Down

Prior to removal of plastic barriers and after pre-clearance clean up of gross contamination, the PQP must conduct a visual inspection of all areas affected by the removal in accordance with ASTM E1368. Inspect for any visible fibers. Spray apply a post removal (lock-down) encapsulant to ceiling, walls, floors and other areas exposed in the removal area. The exposed area includes but is not limited to plastic barriers, furnishings and articles to be discarded as well as dirty change room, air locks for bag removal and decontamination chambers.

3.2.15 Site Inspection

While performing asbestos engineering control work, the Contractor must be subject to on-site inspection by the Contracting Officer who may be assisted by or represented by safety or industrial hygiene personnel. If the work is found to be in violation of this specification, the Contracting Officer or his representative will issue a stop work order to be in effect immediately and until the violation is resolved. All related costs including standby time required to resolve the violation must be at no additional cost to the Government.

3.3 CLEAN-UP AND DISPOSAL

3.3.1 Housekeeping

Essential parts of asbestos dust control are housekeeping and clean-up procedures. Maintain surfaces of the asbestos control area free of accumulations of asbestos fibers. Give meticulous attention to

restricting the spread of dust and debris; keep waste from being distributed over the general area. Use HEPA filtered vacuum cleaners. DO NOT BLOW DOWN THE SPACE WITH COMPRESSED AIR. When asbestos removal is complete, all asbestos waste is removed from the work-site, and final clean-up is completed, the Contracting Officer will attest that the area is safe before the signs can be removed. After final clean-up and acceptable airborne concentrations are attained but before the HEPA unit is turned off and the enclosure removed, remove all pre-filters on the building HVAC system and provide new pre-filters. Dispose of filters as asbestos contaminated materials. Reestablish HVAC mechanical, and electrical systems in proper working order. The Contracting Officer will visually inspect all surfaces within the enclosure for residual material or accumulated dust or debris. The Contractor must re-clean all areas showing dust or residual materials. If re-cleaning is required, air sample and establish an acceptable asbestos airborne concentration after re-cleaning. The Contracting Officer must agree that the area is safe in writing before unrestricted entry is permitted. The Government must have the option to perform monitoring to determine if the areas are safe before entry is permitted.

3.3.2 Title to Materials

All waste materials, except as specified otherwise, become the property of the Contractor and must be disposed of as specified in applicable local, State, and Federal regulations and herein.

3.3.3 Disposal of Asbestos

3.3.3.1 Procedure for Disposal

Coordinate all waste disposal manifests with the Contracting Officer and host installation environmental function. Collect asbestos waste, contaminated waste water filters, asbestos contaminated water, scrap, debris, bags, containers, equipment, and asbestos contaminated clothing which may produce airborne concentrations of asbestos fibers and place in sealed fiber-proof, waterproof, non-returnable containers (e.g. double plastic bags 6 mils thick, cartons, drums or cans). Wastes within the containers must be adequately wet in accordance with 40 CFR 61-SUBPART M. Affix a warning and Department of Transportation (DOT) label to each container including the bags or use at least 6 mils thick bags with the approved warnings and DOT labeling preprinted on the bag. Clearly indicate on the outside of each container the name of the waste generator and the location at which the waste was generated. Prevent contamination of the transport vehicle (especially if the transport vehicle is a rented truck likely to be used in the future for non-asbestos purposes). These precautions include lining the vehicle cargo area with plastic sheeting (similar to work area enclosure) and thorough cleaning of the cargo area after transport and unloading of asbestos debris is complete. Dispose of waste asbestos material at an Environmental Protection Agency (EPA) or State-approved asbestos landfill off Government property. For temporary storage, store sealed impermeable bags in asbestos waste drums or skids. An area for interim storage of asbestos waste-containing drums or skids must be assigned by the Contracting Officer or his authorized representative. Comply with 40 CFR 61-SUBPART M, State, regional, and local standards for hauling and disposal. Sealed plastic bags may be dumped from drums into the burial site unless the bags have been broken or damaged. Damaged bags must remain in the drum and the entire contaminated drum must be buried. Uncontaminated drums may be recycled. All persons handling containers with asbestos containing wastes must comply with

applicable federal, state, and local regulations.

3.3.3.2 Asbestos Disposal Quantity Report

Direct the PQP to record and report, to the Contracting Officer, the amount of asbestos containing material removed and released for disposal. Deliver the report for the previous day at the beginning of each day shift with amounts of material removed during the previous day reported in linear feet or square feet as described initially in this specification and in cubic feet for the amount of asbestos containing material released for disposal.

Allow the PQP to inspect, record and report the amount of asbestos containing material removed and released for disposal on a daily basis. Exclude hazardous waste from waste reduction calculations in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

-- End of Section --

SECTION 02 83 00

LEAD REMEDIATION
08/25

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.

AECOM

HazMat Report	Hazardous Material Report

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP Z9.2	(2018) Fundamentals Governing the Design and Operation of Local Exhaust Ventilation Systems

ASTM INTERNATIONAL (ASTM)

ASTM E1644	(2025) Standard Practice for Hot Plate Digestion of Dust Wipe Samples for the Determination of Lead
ASTM E1726	(2025) Standard Practice for Preparation of Soil Samples by Hotplate Digestion for Subsequent Lead Analysis
ASTM E1727	(2016) Standard Practice for Field Collection of Soil Samples for Subsequent Lead Determination
ASTM E1728/E1728M	(2024) Standard Practice for Collection of Settled Dust Samples Using Wipe Sampling Methods for Subsequent Lead Determination
ASTM E1792	(2024) Standard Specification for Wipe Sampling Materials for Lead in Surface Dust
ASTM E3193	(2023) Standard Test Method for Measurement of Lead (Pb) by Flame Atomic Absorption Spectrophotometry (FAAS)
ASTM E3203	(2024; Rev A) Standard Test Method for Determination of Lead by Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 701	(2023; ERTA 1 2023) Standard Methods of Fire Tests for Flame Propagation of Textiles and Films

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD)

HUD 6780	(1995; Rev July 2012) Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing (2nd Edition)

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

29 CFR 1926.21	Safety Training and Education
29 CFR 1926.33	Access to Employee Exposure and Medical Records
29 CFR 1926.55	Gases, Vapors, Fumes, Dusts, and Mists
29 CFR 1926.59	Hazard Communication
29 CFR 1926.62	Lead
29 CFR 1926.65	Hazardous Waste Operations and Emergency Response
29 CFR 1926.103	Respiratory Protection
29 CFR 1926.1126	Chromium
29 CFR 1926.1127	Cadmium
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 268	Land Disposal Restrictions
40 CFR 745	Lead-Based Paint Poisoning Prevention in Certain Residential Structures
49 CFR 172	Hazardous Materials Table, Special

	Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 178	Specifications for Packagings

UL SOLUTIONS (UL)

UL 586	(2009; Reprint Sep 2022) UL Standard for Safety High-Efficiency Particulate, Air Filter Units

1.2 DEFINITIONS

1.2.1 Abatement

Measures defined in 40 CFR 745, Section 223, designed to permanently eliminate lead-based paint hazards.

1.2.2 Action Level

Employee exposure, without regard to use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air averaged over an 8-hour period; to an airborne concentration of cadmium of 2.5 micrograms per cubic meter of air averaged over an 8-hour period; to an airborne concentration of chromium (VI) of 2.5 micrograms per cubic meter of air averaged over an 8-hour period.

1.2.3 Area Sampling

Sampling of lead, cadmium, chromium concentrations within the lead, cadmium, chromium control area and inside the physical boundaries which is representative of the airborne lead, cadmium, chromium concentrations but is not collected in the breathing zone of personnel (approximately 5 to 6 feet above the floor).

1.2.4 Cadmium Permissible Exposure Limit (PEL)

Five micrograms per cubic meter of air as an 8-hour time weighted average as determined by 29 CFR 1926.1127. If an employee is exposed for more than 8-hours in a work day, determine the PEL by the following formula:

PEL (micrograms/cubic meter of air) = 40/No. hrs worked per day

1.2.5 Certified Industrial Hygienist (CIH)

As used in this section refers to a person retained by the Contractor who is certified as an industrial hygienist and who is trained in the recognition and control of lead, cadmium and chromium hazards in accordance with current federal, State, and local regulations. CIH must be certified for comprehensive practice by the Board for Global EHS Credentialing (BGC). The Certified Industrial Hygienist must be independent of the Contractor and must have no employee or employer relationship which could constitute a conflict of interest.

1.2.6 Child-Occupied Facility

Real property which is a building or portion of a building constructed prior to 1978 visited regularly by the same child, 6-years of age or

under, on at least two different days within any week (Sunday through Saturday period), provided that each day's visit lasts at least 3-hours, and the combined annual visits last at least 60-hours. Child-occupied facilities include but are not limited to, day-care centers, preschools and kindergarten classrooms.

1.2.7 Chromium Permissible Exposure Limit (PEL)

Five micrograms per cubic meter of air as an 8-hour time weighted average as determined by 29 CFR 1926.1126. If an employee is exposed for more than 8-hours in a work day, determine the PEL by the following formula:

PEL (micrograms/cubic meter of air) = 40/No. hrs worked per day

1.2.8 Competent Person (CP)

As used in this section, refers to a person employed by the Contractor who is trained in the recognition and control of lead, cadmium and chromium hazards in accordance with current federal, State, and local regulations and has the authority to take prompt corrective actions to control the lead, cadmium and chromium hazard. The Contractor may provide more than one CP as required to supervise and monitor the work. The CP must be a Certified Industrial Hygienist (CIH) certified by the Board for Global EHS Credentialing (BGC) or a Certified Safety Professional (CSP) certified by the Board of Certified Safety Professionals or a licensed lead-based paint abatement Supervisor/Project Designer in the State of Virginia.

1.2.9 Contaminated Room

Refers to a room for removal of contaminated personal protective equipment (PPE).

1.2.10 Decontamination Shower Facility

That facility that encompasses a clean clothing storage room, and a contaminated clothing storage and disposal rooms, with a shower facility in between.

1.2.11 Deleading

Activities conducted by a person who offers to eliminate lead-based paint or lead-based paint hazards or to plan such activities in commercial buildings, bridges or other structures.

1.2.12 Eight-Hour Time Weighted Average (TWA)

Airborne concentration of lead, cadmium, chromium to which an employee is exposed, averaged over an 8-hour workday as indicated in 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127.

1.2.13 High Efficiency Particulate Air (HEPA) Filter Equipment

HEPA filtered vacuuming equipment with a UL 586 filter system capable of collecting and retaining lead, cadmium, chromium contaminated particulates. A high efficiency particulate filter demonstrates at least 99.97 percent efficiency against 0.3 micron or larger size particles.

1.2.14 Lead

Metallic lead, inorganic lead compounds, and organic lead soaps. Excludes other forms of organic lead compounds. The use of the term lead in this section also refers to paints which contain detectable concentrations of cadmium and chromium. For the purpose of the section lead-based paint (LBP) and paint with lead (PWL), cadmium and chromium are included.

1.2.15 Lead-Based Paint (LBP)

Paint or other surface coating that contains lead in excess of 1.0 milligrams per centimeter squared or 0.5 percent by weight.

1.2.16 Lead-Based Paint Activities

In the case of target housing or child occupied facilities, lead-based paint activities include; a lead-based paint inspection, a risk assessment, or abatement of lead-based paint hazards.

1.2.17 Lead-Based Paint Hazards

Paint-lead hazard, dust-lead hazard or soil-lead hazard as identified in 40 CFR 745, Section 65. Any condition that causes exposure to lead from lead-contaminated dust, lead-contaminated soil, lead-based paint that is deteriorated or present in accessible surfaces, friction surfaces, or impact surfaces that would result in adverse human health effects.

1.2.18 Lead, Cadmium, Chromium Control Area

A system of control methods to prevent the spread of lead, cadmium, chromium dust, paint chips or debris to adjacent areas that may include temporary containment, floor or ground cover protection, physical boundaries, and warning signs to prevent unauthorized entry of personnel. HEPA filtered local exhaust equipment may be used as engineering controls to further reduce personnel exposures or building/outdoor environmental contamination.

1.2.19 Lead Permissible Exposure Limit (PEL)

Fifty micrograms per cubic meter of air as an 8-hour time weighted average as determined by 29 CFR 1926.62. If an employee is exposed for more than 8-hours in a work day, determine the PEL by the following formula:

PEL (micrograms/cubic meter of air) = 400/No. hrs worked per day

1.2.20 Material Containing Lead/Paint with Lead (MCL/PWL)

Any material, including paint, which contains lead as determined by the testing laboratory using a valid test method. The requirements of this section does not apply if no detectable levels of lead are found using a quantitative method for analyzing paint or MCL using laboratory instruments with specified limits of detection (usually 0.01 percent). An X-Ray Fluorescence (XRF) instrument is not considered a valid test method.

1.2.21 Personal Sampling

Sampling of airborne lead, cadmium, chromium concentrations within the breathing zone of an employee to determine the 8-hour time weighted average concentration in accordance with 29 CFR 1926.62, 29 CFR 1926.1126,

29 CFR 1926.1127. Samples must be representative of the employees' work tasks. Breathing zone must be considered an area within a hemisphere, forward of the shoulders, with a radius of 6 to 9 inches and centered at the nose or mouth of an employee.

1.2.22 Physical Boundary

Area physically roped or partitioned off around lead, cadmium, chromium control area to limit unauthorized entry of personnel.

1.2.23 Target Housing

Residential real property which is housing constructed prior to 1978, except housing for the elderly or persons with disabilities (unless any one or more children age 6-years or under resides or is expected to reside in such housing for the elderly or persons with disabilities) or any zero bedroom dwelling.

1.3 DESCRIPTION

Construction activities impacting PWL or material containing lead, cadmium, chromium which are covered by this specification include the demolition or removal of material containing lead, cadmium, chromium. The work covered by this section includes work tasks and the precautions specified in this section for the protection of building occupants and the environment during and after the performance of the hazard abatement activities.

1.3.1 Protection of Existing Areas To Remain

Project work including, but not limited to, lead, cadmium, chromium hazard abatement work, storage, transportation, and disposal must be performed without damaging or contaminating adjacent work and areas. Where such work or areas are damaged or contaminated, restore work and areas to the original condition.

1.3.2 Coordination with Other Work

Coordinate with work being performed in adjacent areas to ensure there are no exposure issues. Explain coordination procedures in the Lead, Cadmium, Chromium Compliance Plan and describe how the Contractor prevents lead, cadmium and chromium exposure to other contractors and Government personnel performing work unrelated to lead, cadmium and chromium activities.

1.3.3 Sampling and Analysis

Submit a log of the analytical results from sampling conducted during the abatement. Keep the log of results current with project activities and brief the results to the Contracting Officer as analytical results are reported. Representative paint chip test results have been included in the AECOM HazMat Report.

1.3.3.1 Dust Wipe Materials, Sampling and Analysis

Sampling must conform to ASTM E1728/E1728M, ASTM E1792. Analysis must conform to ASTM E3193, ASTM E3203 REV A, and ASTM E1644.

1.3.3.2 Soil Sampling and Analysis

Sampling must conform to ASTM E1727. Analysis must conform to ASTM E3193, ASTM E3203 REV A, ASTM E1726, and state and local regulations.

1.3.3.3 Clearance Monitoring

a. Collect dust wipe samples inside the lead, cadmium and chromium hazard control area after the final visual inspection in the quantities and at the locations specified.

(1) Floors.

(2) Interior Window Sills.

(3) Window Troughs.

b. Collect exterior bare soil samples inside the lead, cadmium and chromium hazard control area after the final visual inspection in the quantities and at the locations specified.

(1) Near the building foundation.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Competent Person Qualifications; G

Training Certification; G

Occupational and Environmental Assessment Data Report; G

Medical Examinations; G

Lead, Cadmium, Chromium Waste Management Plan; G

Licenses, Permits and Notifications; G

Occupant Protection Plan; G

Lead, Cadmium, Chromium Compliance Plan; G

Written Evidence of TSD Approval; G

SD-03 Product Data

Respirators; G

Vacuum Filters; G

Negative Air Pressure System; G

Materials and Equipment; G

Expendable Supplies; G

Local Exhaust Equipment; G

Pressure Differential Automatic Recording Instrument; G

Pressure Differential Log; G

SD-06 Test Reports

Sampling and Analysis; G

Occupational and Environmental Assessment Data Report; G

Sampling Results; G

SD-07 Certificates

Testing Laboratory; G

Third Party Consultant Qualifications; G

Notification of the Commencement of Hazard Abatement; G

Clearance Certification; G

SD-11 Closeout Submittals

Hazardous Waste Manifest; G

Turn-In Documents or Weight Tickets; G

Nonhazardous Manifest; G

Bill Of Lading; G

1.5 QUALITY ASSURANCE

1.5.1 Qualifications

1.5.1.1 Competent Person (CP)

Submit name, address, and telephone number of the CP selected to perform responsibilities specified in paragraph COMPETENT PERSON (CP) RESPONSIBILITIES. Provide documented construction project-related experience with implementation of OSHA's Lead in Construction standard (29 CFR 1926.62), Chromium standard (29 CFR 1926.1126), Cadmium standard (29 CFR 1926.1127) which shows ability to assess occupational and environmental exposure to lead, cadmium, chromium; experience with the use of respirators, personal protective equipment and other exposure reduction methods to protect employee health. Demonstrate a minimum of 5 years experience implementing OSHA's Lead in Construction standard (29 CFR 1926.62), Chromium standard (29 CFR 1926.1126), and Cadmium standard (29 CFR 1926.1127). Submit proper documentation that the CP is trained and licensed and certified in accordance with federal, State of Virginia and local laws.

1.5.1.2 Training Certification

Submit a certificate for each worker and supervisor, signed and dated by the accredited training provider, stating that the employee has received the required lead, cadmium and chromium training specified in 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 40 CFR 745 and is certified to perform or supervise deleading, lead removal or demolition activities in the State of Virginia.

1.5.1.3 Testing Laboratory

Submit the name, address, and telephone number of the testing laboratory selected to perform the air, soil, and wipe analysis, testing, and reporting of airborne concentrations of lead, cadmium and chromium. Use a laboratory participating in the EPA National Lead Laboratory Accreditation Program (NLLAP) by being accredited by either the American Association for Laboratory Accreditation (A2LA) or the American Industrial Hygiene Association (AIHA) and that is successfully participating in the Environmental Lead Proficiency Analytical Testing (ELPAT) program to perform sample analysis. Laboratories selected to perform blood lead analysis must be OSHA approved.

1.5.1.4 Third Party Consultant Qualifications

Submit the name, address and telephone number of the third party consultant selected to perform the wipe sampling for determining concentrations of lead, cadmium and chromium in dust. Submit proper documentation that the consultant is trained and certified as an inspector technician or inspector/risk assessor by the USEPA authorized State (or local) certification and accreditation program.

1.5.1.5 Certified Risk Assessor

The Certified Risk Assessor must be certified pursuant to 40 CFR 745, Section 226 or applicable state certifications and be responsible to perform the clearance sampling, clearance sample data evaluation and summarize clearance sampling results in a section of the abatement report. The risk assessor must sign the abatement report to indicate clearance requirements for the contract have been met.

1.5.2 Requirements

1.5.2.1 Competent Person (CP) Responsibilities

a. Verify training meets all federal, State, and local requirements.

b. Review and approve Lead, Cadmium, Chromium Compliance Plan for conformance to the applicable referenced standards.

c. Continuously inspect LBP/PWL or MCL work for conformance with the approved plan.

d. Perform (or oversee performance of) air sampling.

e. Ensure work is performed in strict accordance with specifications at all times.

f. Control work to prevent hazardous exposure to human beings and to the environment at all times.

g. Supervise final cleaning of the lead, cadmium, chromium control area, take clearance wipe samples if necessary; review clearance sample results and make recommendations for further cleaning.

h. Certify the conditions of the work as called for elsewhere in this specification.

i. The CP must be certified pursuant to 40 CFR 745, Section 226 and is responsible for development and implementation of the occupant protection plan, the abatement report and supervise lead, cadmium and chromium hazard abatement work activities.

1.5.2.2 Lead, Cadmium, Chromium Compliance Plan

Submit a detailed job-specific plan of the work procedures to be used in the disturbance of lead, cadmium and chromium, LBP/PWL or MCL. Include in the plan a sketch showing the location, size, and details of lead, cadmium, chromium control areas, critical barriers, physical boundaries, location and details of decontamination facilities, viewing ports, and mechanical ventilation system. Include a description of equipment and materials, work practices, controls and job responsibilities for each activity from which lead, cadmium, chromium is emitted. Include in the plan, eating, drinking, smoking, hygiene facilities and sanitary procedures, interface of trades, sequencing of lead, cadmium, chromium related work, collected waste water and dust containing lead, cadmium, chromium and debris, air sampling, respirators, personal protective equipment, and a detailed description of the method of containment of the operation to ensure that lead, cadmium, chromium is not released outside of the lead, cadmium, chromium control area. Include site preparation, cleanup and clearance procedures. Include occupational and environmental sampling, training and strategy, sampling and analysis strategy and methodology, frequency of sampling, duration of sampling, and qualifications of sampling personnel in the air sampling portion of the plan. Include a description of arrangements made among contractors on multicontractor worksites to inform affected employees and to clarify responsibilities to control exposures.

The plan must be developed and signed by a certified Lead Project Designer in the State of Virginia. The plan must include the name and certification number of the person signing the plan.

In occupied buildings, the plan must also include an occupant protection program that describes the measures that are taken during the work to notify and protect the building occupants.

1.5.2.3 Occupational and Environmental Assessment Data Report

If initial monitoring is necessary, submit occupational and environmental sampling results to the Contracting Officer within three working days of collection, signed by the testing laboratory employee performing the analysis, the employee that performed the sampling, and the CP.

In order to reduce the full implementation of 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 the Contractor must provide documentation. Submit a report that supports the determination to reduce full implementation of the requirements of 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 and supporting the Lead, Cadmium, Chromium Compliance Plan.

a. The initial monitoring must represent each job classification, or if working conditions are similar to previous jobs by the same employer, provide previously collected exposure data that can be used to estimate worker exposures per 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127. The data must represent the worker's regular daily exposure to lead, cadmium, chromium for stated work.

b. Submit worker exposure data gathered during the task based trigger operations of 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 with a complete process description. This includes manual demolition, manual scraping, manual sanding, heat gun, power tool cleaning, rivet busting, cleanup of dry expendable abrasives, abrasive blast enclosure removal, abrasive blasting, welding, cutting and torch burning where lead, cadmium and chromium containing coatings are present.

c. The initial assessment must determine the requirement for further monitoring and the need to fully implement the control and protective requirements including the lead, cadmium, chromium compliance plan per 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127.

1.5.2.4 Medical Examinations

Submit documentation of workers who performed lead, cadmium, chromium activities including the name of each employee, type of exam received, and date of the exam. The documentation must also include a signed statement that the medical examination was reviewed by the contractor's Safety Manager stating that the listed personnel have received the required medical examination in accordance with 29 CFR 1926.62 and the exam results are saved. Initial medical surveillance as required by 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 must be made available to all employees exposed to lead, cadmium, chromium at any time (one day) above the action level. Full medical surveillance must be made available to all employees on an annual basis who are or may be exposed to lead, cadmium and chromium in excess of the action level for more than 30 days a year or as required by 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127. Adequate records must show that employees meet the medical surveillance requirements of 29 CFR 1926.33, 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 and 29 CFR 1926.103. Provide medical surveillance to all personnel exposed to lead, cadmium, chromium as indicated in 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127. Maintain complete and accurate medical records of employees for the duration of employment plus 30 years.

1.5.2.5 Training

Train each employee performing work that disturbs lead, cadmium, chromium, who performs LBP/MCL/PWL disposal, and air sampling operations prior to the time of initial job assignment and annually thereafter, in accordance with 29 CFR 1926.21, 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127, 40 CFR 745 and State of Virginia and local regulations where appropriate.

1.5.2.6 Respiratory Protection Program

a. Provide each employee required to wear a respirator a respirator fit test at the time of initial fitting and at least annually thereafter as required by 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127.

b. Establish and implement a respiratory protection program as required by 29 CFR 1926.103, 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127

and 29 CFR 1926.55.

1.5.2.7 Hazard Communication Program

Establish and implement a Hazard Communication Program as required by 29 CFR 1926.59.

1.5.2.8 Lead, Cadmium, Chromium Waste Management

The Lead, Cadmium, Chromium Waste Management Plan must comply with applicable requirements of federal, State, and local hazardous waste regulations and address:

a. Identification and classification of wastes associated with the work.

b. Estimated quantities of wastes to be generated and disposed of.

c. Names and qualifications of each contractor that transports, stores, treats, or disposes of the wastes. Include the facility location and a 24-hour point of contact. Furnish two copies of State (in accordance with local hazardous waste permits, manifests and USEPA Identification numbers.

d. Names and qualifications (experience and training) of personnel working on-site with hazardous wastes.

e. List of waste handling equipment to be used in performing the work, to include cleaning, volume reduction, and transport equipment.

f. Spill prevention, containment, and cleanup contingency measures including a health and safety plan to be implemented in accordance with 29 CFR 1926.65.

g. Work plan and schedule for waste containment, removal and disposal. Proper containment of the waste includes using acceptable waste containers (e.g., 55-gallon drums) as well as proper marking/labeling of the containers. All drums must meet applicable United Nations (UN) requirements and DOT regulations. Clean up and containerize wastes daily.

h. Include any process that may alter or treat waste rendering a hazardous waste non hazardous.

i. Unit cost for hazardous waste disposal according to this plan.

1.5.2.9 Environmental, Safety and Health Compliance

In addition to the detailed requirements of this specification, comply with laws, ordinances, rules, and regulations of federal, State, and local authorities regarding lead, cadmium and chromium. Comply with the applicable requirements of the current issue of 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127, EM 385-1-1. Submit matters regarding interpretation of standards to the Contracting Officer for resolution before starting work. Where specification requirements and the referenced documents vary, the most stringent requirements apply.

a. Licensing in the state of Virginia is required.

1.5.3 Licenses, Permits and Notifications

Certify and submit in writing to the state's environmental protection agency responsible for lead hazard abatement activities and the Contracting Officer at least 20 days prior to the commencement of work that licenses, permits and notifications have been obtained. All associated fees or costs incurred in obtaining the licenses, permits and notifications are included in the contract price.

1.5.4 Occupant Protection Plan

The certified project designer must develop and implement an Occupant Protection Plan describing the measures and management procedures to be taken during lead, cadmium and chromium hazard abatement activities to protect the building occupants/building facilities and the outside environment from exposure to any lead, cadmium and chromium contamination while lead, cadmium and chromium hazard abatement activities are performed.

1.5.5 Pre-Construction Conference

Along with the CP, meet with the Contracting Officer to discuss in detail the Lead, Cadmium, Chromium Waste Management Plan and the Lead, Cadmium, Chromium Compliance Plan, including procedures and precautions for the work.

1.6 EQUIPMENT

1.6.1 Respirators

Furnish appropriate respirators approved by the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services, for use in atmospheres containing lead, cadmium and chromium dust, fume and mist. Respirators must comply with the requirements of 29 CFR 1926.62, 29 CFR 1926.1126, and 29 CFR 1926.1127.

1.6.2 Special Protective Clothing

Personnel exposed to lead, cadmium, chromium contaminated dust must wear proper disposable protective whole body clothing, head covering, gloves, eye, and foot coverings as required by 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 and applicable state and local regulations. Furnish proper disposable plastic or rubber gloves to protect hands. Reduce the level of protection only after obtaining approval from the CP.

1.6.3 Rental Equipment Notification

If rental equipment is to be used during PWL or MCL handling and disposal, notify the rental agency in writing concerning the intended use of the equipment.

1.6.4 Vacuum Filters

UL 586 labeled HEPA filters.

1.6.5 Equipment for Government Personnel

Furnish the Contracting Officer with two complete sets of personal protective equipment (PPE) daily, as required herein, for entry into and inspection of the lead, cadmium and chromium removal work within the lead,

cadmium and chromium controlled area. Personal protective equipment must include disposable whole body covering, including appropriate foot, head, eye, and hand protection. PPE remains the property of the Contractor. The Government will provide respiratory protection for the Contracting Officer.

1.6.6 Abrasive Removal Equipment

The use of powered machine for vibrating, sanding, grinding, or abrasive blasting is prohibited unless equipped with local exhaust ventilation systems equipped with high efficiency particulate air (HEPA) filters.

1.6.7 Negative Air Pressure System

1.6.7.1 Minimum Requirements

Do not proceed with work in the area until containment is set up and HEPA filtration systems are in place. The negative air pressure system must meet the requirements of ASSP Z9.2 including approved HEPA filters in accordance with UL 586. Negative air pressure equipment must be equipped with new HEPA filters, and be sufficient to maintain a minimum pressure differential of minus 0.02 inch of water column relative to adjacent, unsealed areas. Negative air pressure system minimum requirements are listed as follows:

a. The unit must be capable of delivering its rated volume of air with a clean first stage filter, an intermediate filter and a primary HEPA filter in place.

b. The HEPA filter must be certified as being capable of trapping and retaining mono-disperse particles as small as 0.3 micrometers at a minimum efficiency of 99.97 percent.

c. The unit must be capable of continuing to deliver no less than 70 percent of rated capacity when the HEPA filter is 70 percent full or measures 2.5 inches of water static pressure differential on a magnehelic gauge.

d. Equip the unit with a manometer-type negative pressure differential monitor with minor scale division of 0.02 inch of water and accuracy within plus or minus 1.0 percent. The manometer must be calibrated daily as recommended by the manufacturer.

e. Equip the unit with a means for the operator to easily interpret the readings in terms of the volumetric flow rate of air per minute moving through the machine at any given moment.

f. Equip the unit with an electronic mechanism that automatically shuts the machine off in the event of a filter breach or absence of a filter.

g. Equip the unit with an audible horn that sounds an alarm when the machine has shut itself off.

h. Equip the unit with an automatic safety mechanism that prevents a worker from improperly inserting the main HEPA filter.

1.6.7.2 Auxiliary Generator

Provide an auxiliary generator with capacity to power a minimum of 50

percent of the negative air machines at any time during the work. When power fails, the generator controls must automatically start the generator and switch the negative air pressure system machines to generator power. The generator must not present a carbon monoxide hazard to workers.

1.6.8 Vacuum Systems

Vacuum systems must be suitably sized for the project, and filters must be capable of trapping and retaining all mono-disperse particles as small as 0.3 micrometers (mean aerodynamic diameter) at a minimum efficiency of 99.97 percent. Properly dispose of used filters that are being replaced.

1.6.9 Heat Blower Guns

Heat blower guns must be flameless, electrical, paint-softener type with controls to limit temperature to less than 1,100 degrees F. Heat blower must be (grounded) 120 volts ac, and must be equipped with cone, fan, glass protector and spoon reflector nozzles.

1.7 PROJECT/SITE CONDITIONS

1.7.1 Protection of Existing Work to Remain

Perform work without damage or contamination of adjacent areas. Where existing work is damaged or contaminated, restore work to its original condition or better as determined by the Contracting Officer.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Keep materials and equipment needed to complete the project available and on the site. Submit a description of the materials and equipment required; including Safety Data Sheets (SDSs) for material brought onsite to perform the work.

2.1.1 Expendable Supplies

Submit a description of the expendable supplies required.

2.1.1.1 Polyethylene Bags

Disposable bags must be polyethylene plastic and be a minimum of 6 mils thick (4 mils thick if double bags are used) or any other thick plastic material shown to demonstrate at least equivalent performance; and capable of being made leak-tight. Leak-tight means that solids, liquids or dust cannot escape or spill out.

2.1.1.2 Polyethylene Leak-tight Wrapping

Wrapping used to wrap lead, cadmium, chromium contaminated debris must be polyethylene plastic that is a minimum of 6 mils thick or any other thick plastic material shown to demonstrate at least equivalent performance.

2.1.1.3 Polyethylene Sheeting

Sheeting must be polyethylene plastic with a minimum thickness of 6 mil, or any other thick plastic material shown to demonstrate at least equivalent performance; and be provided in the largest sheet size

reasonably accommodated by the project to minimize the number of seams. Where the project location constitutes an out of the ordinary potential for fire, or where unusual fire hazards cannot be eliminated, provide flame-resistant polyethylene sheets which conform to the requirements of NFPA 701.

2.1.1.4 Tape and Adhesive Spray

Tape and adhesive must be capable of sealing joints between polyethylene sheets and for attachment of polyethylene sheets to adjacent surfaces. After dry application, tape or adhesive must retain adhesion when exposed to wet conditions, including amended water or wetting agents. Tape must be minimum 2 inches wide, industrial strength.

2.1.1.5 Containers

When used, containers must be leak-tight and be labeled in accordance with EPA, DOT and OSHA standards and UN Regulations.

2.1.1.6 Chemical Paint Strippers

Chemical paint strippers must not contain methylene chloride, n-methylpyrrodlidione, or other regulated solvents, and be formulated to prevent stain, discoloration, or raising of the substrate materials.

2.1.1.7 Chemical Paint Stripper Neutralizer

Neutralizers for paint strippers must be compatible with the substrate and suitable for use with the chemical stripper that has been applied to the surface.

2.1.1.8 Detergents and Cleaners

Detergents or cleaning agents must not contain trisodium phosphate and have demonstrated effectiveness in lead, cadmium and chromium control work using cleaning techniques specified by HUD 6780 guidelines.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Protection

3.1.1.1 Notification

a. Notify the Contracting Officer 20 days prior to the start of any lead, cadmium and chromium work.

c. Notification of the Commencement of Hazard Abatement

Submit a copy of the notification of the commencement of hazard abatement to the contracting officer.

3.1.1.2 Lead, Cadmium, Chromium Control Area

a. Physical Boundary - Provide physical boundaries around the lead, cadmium, chromium control area by roping off the area designated in the work plan or providing curtains, portable partitions or other enclosures to ensure that lead, cadmium and chromium does not escape

outside of the lead, cadmium and chromium control area. Prohibit the general public from accessing the lead, cadmium, chromium control areas.

b. Warning Signs - Provide warning signs at approaches to lead, cadmium, chromium control areas. Locate signs at such a distance that personnel may read the sign and take the necessary precautions before entering the area. Signs must comply with the requirements of 29 CFR 1926.62 and applicable state and local regulations.

3.1.1.3 Furnishings

The Government will remove furniture and equipment from the building before lead, cadmium and chromium work begins.

3.1.1.4 Heating, Ventilating and Air Conditioning (HVAC) Systems

Shut down, lock out, and isolate HVAC systems that supply, exhaust, or pass through the lead, cadmium, chromium control areas. Seal intake and exhaust vents in the lead, cadmium, chromium control area with 6 mil plastic sheet and tape. Seal seams in HVAC components that pass through the lead, cadmium, chromium control area.

3.1.1.5 Local Exhaust System

Provide a local exhaust system in the lead, cadmium, chromium control area in accordance with ASSP Z9.2, 29 CFR 1926.62, 29 CFR 1926.1126 and 29 CFR 1926.1127 that provides at least 4 air changes per hour inside of the negative pressure enclosure. Local exhaust equipment must be operated 24-hours per day, until the lead, cadmium, chromium control area is removed and must be leak proof to the filter and equipped with HEPA filters. Maintain a minimum pressure differential in the lead, cadmium, chromium control area of minus 0.02 inch of water column relative to adjacent, unsealed areas. Provide continuous 24-hour per day monitoring of the pressure differential with a pressure differential automatic recording instrument. The building ventilation system must not be used as the local exhaust system for the lead, cadmium, chromium control area. Filters on exhaust equipment must conform to ASSP Z9.2 and UL 586. Terminate the local exhaust system out of doors and remote from any public access or ventilation system intakes.

3.1.1.6 Negative Air Pressure System Containment

a. Operate the negative air pressure systems to provide at least 4 air changes per hour inside the containment. Operate the local exhaust unit equipment continuously until the containment is removed. Smoke test the negative air pressure system for leaks at the beginning of each shift. The certified supervisor is responsible to continuously monitor and keep a pressure differential log with an automatic manometric recording instrument. Notify the Contracting Officer immediately if the pressure differential falls below the prescribed minimum. Submit the continuously monitored pressure differential log, as specified. Do not use the building ventilation system as the local exhaust system. Terminate the local exhaust system out of doors unless the Contracting Officer allows an alternate arrangement. All filters must be new at the beginning of the project and be periodically changed as necessary to maintain specified pressure differential and disposed of as lead, cadmium and chromium contaminated waste.

b. Discontinuing Negative Air Pressure System. Operate the negative air pressure system continuously during abatement activities unless otherwise authorized by the Contracting Officer. At the completion of the project, units must be run until full cleanup has been completed and final clearance testing requirements have been met. Dismantling of the negative air pressure systems must be approved by the Contracting Officer be as presented in the Lead, Cadmium, Chromium Compliance Plan. Seal the HEPA filter machine intakes with polyethylene to prevent environmental contamination.

3.1.1.7 Decontamination Shower Facility

Provide clean and contaminated change rooms and shower facilities in accordance with this specification and 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127.

3.1.1.8 Eye Wash Station

Provide suitable facilities within the work area for quick drenching or flushing of the eyes where eyes may be exposed to injurious corrosive materials.

3.1.1.9 Mechanical Ventilation System

a. Use adequate ventilation to control personnel exposure to lead, cadmium and chromium in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127. To the extent feasible, use local exhaust ventilation or other collection systems, approved by the CP. Evaluate and maintain local exhaust ventilation systems in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127.

b. Vent local exhaust outside the building and away from building ventilation intakes or ensure system is connected to HEPA filters.

c. Use locally exhausted, power actuated tools or manual hand tools.

3.1.1.10 Personnel Protection

Personnel must wear and use protective clothing and equipment as specified herein. Eating, smoking, or drinking or application of cosmetics is not permitted in the lead, cadmium, chromium control area. No one is permitted in the lead, cadmium, chromium control area unless they have been appropriately trained, medically cleared, and provided with protective equipment.

3.2 ERECTION

3.2.1 Lead, Cadmium, Chromium Control Area Requirements

Establish a lead, cadmium, chromium control area by completely establishing barriers and physical boundaries around the area or structure where PWL or MCL removal operations are performed.

3.3 APPLICATION

3.3.1 Lead, Cadmium, Chromium Work

Perform lead, cadmium, chromium work in accordance with approved Lead,

Cadmium, Chromium Compliance Plan. Use procedures and equipment required to limit occupational exposure and environmental contamination with lead, cadmium, chromium when the work is performed in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 or 40 CFR 745, and as specified herein. Dispose of all PWL or MCL and associated waste in compliance with federal, State, and local requirements.

3.3.2 Paint with Lead, Cadmium, Chromium or Material Containing Lead, Cadmium, Chromium Removal

Manual or power sanding or grinding of lead, cadmium, chromium surfaces or materials is not permitted unless tools are equipped with HEPA attachments or wet methods. The dry sanding or grinding of surfaces that contain lead, cadmium, chromium is prohibited. Provide methodology for removing lead, cadmium, chromium in the Lead, Cadmium, Chromium Compliance Plan. Select lead, cadmium, chromium removal processes to minimize contamination of work areas outside the control area with lead, cadmium, chromium contaminated dust or other lead, cadmium, chromium contaminated debris or waste and to ensure that unprotected personnel are not exposed to hazardous concentrations of lead, cadmium, chromium. Describe this removal process in the Lead, Cadmium, Chromium Compliance Plan.

Avoid deterioration of the substrate. Provide surface preparations for painting in accordance with Section 09 90 00 PAINTS AND COATINGS.

Provide methodology for lead, cadmium and chromium, LBP/PWL abatement/control and processes to minimize contamination of work areas outside the control area with lead, cadmium, chromium contaminated dust or other lead, cadmium, chromium contaminated debris/waste and to ensure that unprotected personnel are not exposed to hazardous concentrations of lead, cadmium, chromium. Describe this lead,, cadmium and chromium, LBP/PWL removal/control process in the Lead, Cadmium, Chromium Compliance Plan.

3.3.2.1 Paint with Lead, Cadmium, Chromium or Material Containing Lead, Cadmium, Chromium - Indoor Removal

Perform removal and thermal cutting in the lead, cadmium, chromium control areas using enclosures, barriers or containments and powered locally exhausted tools equipped with HEPA filters. Collect residue and debris for disposal in accordance with federal, State, and local requirements.

3.3.2.2 Paint with Lead, Cadmium, Chromium or Material Containing Lead, Cadmium, Chromium - Outdoor Removal

Perform outdoor removal as indicated in federal, State, and local regulations and in the Lead, Cadmium, Chromium Compliance Plan. The worksite preparation (barriers or containments) must be job dependent and presented in the Lead, Cadmium, Chromium Compliance Plan.

3.3.3 Personnel Exiting Procedures

Whenever personnel exit the lead, cadmium, chromium controlled area, they must perform the following procedures and must not leave the work place wearing any clothing or equipment worn in the control area:

a. Vacuum all clothing before entering the contaminated change room.

b. Remove protective clothing in the contaminated change room, and place them in an approved impermeable disposal bag.

c. Shower.

d. Wash hands and face at the site, don appropriate disposable or uncontaminated reusable clothing, move to an appropriate shower facility, shower.

e. Change to clean clothes prior to leaving the clean clothes storage area.

3.4 FIELD QUALITY CONTROL

3.4.1 Tests

3.4.1.1 Air and Wipe Sampling

Conduct sampling for lead, cadmium, chromium in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127, and as specified herein. Air and wipe sampling must be directed or performed by the CP.

a. The CP must be on the job site directing the air and wipe sampling and inspecting the PWL or MCL removal work to ensure that the requirements of the contract have been satisfied during the entire PWL or MCL operation.

b. Collect personal air samples on employees who are anticipated to have the greatest risk of exposure as determined by the CP. In addition, collect air samples on at least twenty-five percent of the work crew or a minimum of two employees, whichever is greater, during each work shift.

c. Submit results of air samples, signed by the CP, within 72-hours after the air samples are taken.

d. Conduct area air sampling daily, on each shift in which lead, cadmium and chromium and lead-based paint removal operations are performed, in areas immediately adjacent to the lead, cadmium and chromium control area. Conduct sufficient area monitoring to ensure unprotected personnel are not exposed at or above 30 micrograms of lead per cubic meter of air or 2.5 micrograms of cadmium/chromium per cubic meter of air. If 30 micrograms of lead per cubic meter of air or 2.5 micrograms of cadmium/chromium per cubic meter of air is reached or exceeded, stop work, correct the conditions(s) causing the increased levels. Notify the Contracting Officer immediately. Determine if condition(s) require any further change in work methods. Resume removal work only after the CP and the Contracting Officer give approval.

e. Surface Wipe Samples - Collect surface wipe samples on floors at a location no greater than 10 feet outside the lead, cadmium, chromium control area at a frequency of once per day while lead, cadmium, chromium removal work is conducted in occupied buildings. Surface wipe samples or Micro Vacuum surface sample results must meet criteria in paragraph CLEARANCE CERTIFICATION.

3.4.1.2 Sampling After Removal

After the visual inspection, conduct soil sampling if bare soil is present during external removal operations and collect wipe and soil samples

according to the HUD protocol contained in HUD 6780 to determine the lead, cadmium and chromium content of settled dust in micrograms per square meter foot of surface area and parts per million (ppm) for soil.

3.4.1.3 Testing of Material Containing Lead, Cadmium, Chromium Residue

Test residue in accordance with 40 CFR 261 or applicable state or local regulations for hazardous waste.

3.5 CLEANING AND DISPOSAL

3.5.1 Cleanup

Maintain surfaces of the lead, cadmium, chromium control area free of accumulations of dust and debris. Restrict the spread of dust and debris; keep waste from being distributed over the work area. Do not dry sweep or use pressurized air to clean up the area. At the end of each shift and when the lead, cadmium, chromium operation has been completed, clean the controlled area of all visible contamination by vacuuming with a HEPA filtered vacuum cleaner, wet mopping the area and wet wiping the area as indicated by the Lead, Cadmium, Chromium Compliance Plan. Reclean areas showing dust or debris. After visible dust and debris is removed, wet wipe and HEPA vacuum all surfaces in the controlled area. If adjacent areas become contaminated at any time during the work, clean, visually inspect, and then wipe sample all contaminated areas. The CP must then certify in writing that the area has been cleaned of lead, cadmium and chromium contamination before clearance testing.

3.5.1.1 Clearance Certification

The CP must certify in writing that air samples collected outside the lead, cadmium, chromium control area during paint removal operations are less than 30 micrograms of lead per cubic meter of air and less than 2.5 micrograms of cadmium/chromium per cubic meter of air; the respiratory protection used for the employees was adequate; the work procedures were performed in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127; and that there were no visible accumulations of material and dust containing lead, cadmium, chromium left in the work site. Do not remove the lead, cadmium, chromium control area or roped off boundary and warning signs prior to the Contracting Officer's acknowledgement of receipt of the CP certification.

The third party consultant must certify surface wipe sample results collected inside and outside the work area are less than 5 micrograms of lead per 0.1 square foot on floors, less than 40 micrograms of lead per 0.1 square foot on interior window sills and less than 100 micrograms of lead per 0.1 square foot on window troughs.

The third party consultant must certify surface wipe sample or Micro Vacuum surface sample results collected inside and outside the work area are less than 200 micrograms of lead per square foot on floors or horizontal surfaces. Use Micro Vacuum technique on rough or porous surfaces which are difficult to achieve clearance by the wipe sampling methodology. Micro Vacuum readings must be calculated by a certified industrial hygienist.

Certify surface wipe samples are not significantly greater than the initial surface loading determined prior to work.

Clear the lead, cadmium, chromium control area in industrial facilities of all visible dust and debris.

For exterior work, soil samples taken at the exterior of the work site must be used to determine if soil lead, cadmium, chromium levels have increased at a statistically significant level (significant at the 95 percent confidence limit) from the soil lead, cadmium, chromium levels prior to the operation. If soil lead, cadmium, chromium levels either show a statistically significant increase above soil lead, cadmium, chromium levels prior to work or soil lead, cadmium, chromium levels above any applicable federal or state standard for lead, cadmium, chromium in soil, the soil must be remediated.

For lead, cadmium and chromium-based paint hazard abatement work, surface wipe and soil sampling must be conducted and clearance determinations made according to the work practice standards presented in 40 CFR 745.227.

3.5.2 Disposal

a. Dispose of material, whether hazardous or non-hazardous in accordance with all laws and provisions and all federal, State or local regulations. Ensure all waste is properly characterized. The result of each waste characterization dictates disposal requirements. Separate hazardous waste from non-hazardous waste to be recycled or reclaimed to the greatest extent practicable in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

b. Contractor is responsible for segregation of waste. Collect lead, cadmium, chromium contaminated waste, scrap, debris, bags, containers, equipment, and lead, cadmium, chromium contaminated clothing that may produce airborne concentrations of lead, cadmium, chromium particles. Label the containers in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 and 40 CFR 261, 40 CFR 262 and corresponding state regulations.

c. Dispose of lead, cadmium, chromium contaminated material classified as hazardous waste at an EPA or State approved hazardous waste treatment, storage, or disposal facility off Government property.

d. Accumulate waste materials in U.S. Department of Transportation (49 CFR 178) compliant container. Properly label each drum to identify the type of hazardous material (49 CFR 172). For hazardous waste, the collection container requires marking/labeling in accordance with 40 CFR 262 and corresponding state regulations during the accumulation/collection timeframe. The Contracting Officer or an authorized representative will assign an area for accumulation of waste containers. Coordinate authorized accumulation volumes and time limits with the host installation environmental function.

e. Handle, store, transport, and dispose lead, cadmium, chromium or lead, cadmium, chromium contaminated waste in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, and 40 CFR 265 and state and local regulations. Comply with land disposal restriction notification requirements as required by 40 CFR 268.

f. All lead, cadmium, and chromium waste generation, management, and disposal must be coordinated with the host installation environmental function.

3.5.2.1 Disposal Documentation

Coordinate all disposal or off-site shipments of lead, cadmium, and chromium waste with the host installation environmental function. Submit written evidence of TSD approval to demonstrate the hazardous waste treatment, storage, or disposal facility (TSD) is approved for lead, cadmium, chromium disposal by the EPA, State or local regulatory agencies. Submit one copy of the completed hazardous waste manifest, nonhazardous manifest, or bill of lading, signed and dated by the initial transporter in accordance with 40 CFR 262. Provide a certificate that the waste was accepted by the disposal facility. Provide turn-in documents or weight tickets for non-hazardous waste disposal. Exclude hazardous waste from waste reduction calculations in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

3.5.2.2 Payment for Hazardous Waste

Payment for disposal of hazardous and non-hazardous waste will not be made until a signed copy of the manifest from the treatment or disposal facility is received and approved by the Contracting Officer. The manifest must detail and certify the amount of lead, cadmium, chromium containing materials or non-hazardous waste delivered to the treatment or disposal facility.

-- End of Section --

SECTION 02 84 16

HANDLING OF LIGHTING BALLASTS AND LAMPS CONTAINING PCBs AND MERCURY
11/22

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.

AECOM

HazMat Report	Hazardous Material Report

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

29 CFR 1910.1000	Air Contaminants
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 268	Land Disposal Restrictions
40 CFR 270	EPA Administered Permit Programs: The Hazardous Waste Permit Program
40 CFR 273	Standards for Universal Waste Management
40 CFR 761	Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
49 CFR 178	Specifications for Packagings

1.2 REQUIREMENTS

Removal and disposal of PCB containing lighting ballasts and associated mercury-containing lamps. Contractor may encounter leaking PCB ballasts.

1.3 DEFINITIONS

1.3.1 Certified Industrial Hygienist (CIH)

A industrial hygienist hired by the contractor must be certified by the American Board of Industrial Hygiene.

1.3.2 Leak

Leak or leaking means any instance in which a PCB article, PCB container, or PCB equipment has any PCBs on any portion of its external surface.

1.3.3 Lamps

Lamp is defined as the bulb or tube portion of an electric lighting device. A lamp is specifically designed to produce radiant energy, most often in the ultraviolet, visible, and infra-red regions of the electromagnetic spectrum. Examples of common electric lamps include, but are not limited to, fluorescent, high intensity discharge, neon, mercury vapor, high pressure sodium, and metal halide lamps.

1.3.4 Polychlorinated Biphenyls (PCBs)

PCBs as used in this specification mean the same as PCBs, and all related items, as defined in 40 CFR 761, Section 3, Definitions.

1.3.5 Spill

Spill means both intentional and unintentional spills, leaks, and other uncontrolled discharges when the release results in any quantity of PCBs running off or about to run off the external surface of the equipment or other PCB source, as well as the contamination resulting from those releases.

1.3.6 Universal Waste

Universal Waste means any of the following hazardous wastes that are managed under the universal waste requirements 40 CFR 273:

(1) Batteries as described in Sec. 273.2 of this chapter;

(2) Pesticides as described in Sec. 273.3 of this chapter;

(3) Mercury containing equipment as described in Sec. 273.4 of this chapter; and

(4) Lamps as described in Sec. 273.5 of this chapter.

1.4 QUALITY ASSURANCE

1.4.1 Regulatory Requirements

Perform PCB related work in accordance with 40 CFR 761. Perform mercury-containing lamps storage and transport in accordance with 40 CFR 261, 40 CFR 264, 40 CFR 265, 40 CFR 273.

1.4.2 Training

Instruction and certification of training of all persons involved in the

removal of PCB containing lighting ballasts and mercury-containing lamps is the responsibility of the Certified Industrial Hygienist (CIH). Include in the instruction: The dangers of PCB and mercury exposure, decontamination, safe work practices, and applicable OSHA and EPA regulations. The CIH must review and approve the PCB and Mercury-Containing Lamp Removal Work Plans.

1.4.3 Regulation Documents

Maintain at all times one copy each at the office and one copy each in view at the job site of 29 CFR 1910.1000, 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 265, 40 CFR 268, 40 CFR 270, 40 CFR 273 and of the Contractor removal work plan and disposal plan for PCB and for associated mercury-containing lamps.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-07 Certificates

Qualifications of CIH; G

Training Certification; G

PCB and Lamp Removal Work Plan; G

PCB and Lamp Disposal Plan; G

SD-11 Closeout Submittals

Transporter Certification of notification to EPA of their PCB waste activities and EPA ID numbers; G

Certification of Decontamination

Certificate of Disposal and/or recycling. Submit to the Government before application for payment within 30 days of the date that the disposal of the PCB and mercury-containing lamp waste identified on the manifest was completed.

Testing Results

1.6 ENVIRONMENTAL REQUIREMENTS

Use special clothing:

a. Disposable gloves (polyethylene)

b. Eye protection

c. PPE as required by CIH

1.7 SCHEDULING

Notify the Contracting Officer 20 days prior to the start of PCB and mercury-containing lamp removal work.

1.8 QUALITY ASSURANCE

1.8.1 Qualifications of CIH

Submit the name, address, and telephone number of the Industrial Hygienist selected to perform the duties in paragraph CERTIFIED INDUSTRIAL HYGIENIST. Submit training certification that the Industrial Hygienist is certified, including certification number and date of certification or re certification.

1.8.2 PCB and Lamp Removal Work Plan

Submit a job-specific plan within 20 calendar days after award of contract of the work procedures to be used in the removal, packaging, and storage of PCB-containing lighting ballasts and associated mercury-containing lamps. Include in the plan: Requirements for Personal Protective Equipment (PPE), spill cleanup procedures and equipment, eating, smoking and restroom procedures. The plan must be approved and signed by the Certified Industrial Hygienist. Obtain approval of the plan by the Contracting Officer prior to the start of PCB and/or lamp removal work. The AECOM HazMat Report notes the approximate locations and quantities of ballast and lamps (fluorescent light tubes).

1.8.3 PCB and Lamp Disposal Plan

Submit a PCB and lamp Disposal Plan within 45 calendar days after award of contract, complying with the applicable requirements of federal, state, and local PCB and Universal waste regulations and address:

a. Estimated quantities of wastes to be generated, disposed of, and recycled.

b. Names and qualifications of each Contractor that will be transporting, storing, treating, and disposing of the wastes. Include the facility location. Furnish two copies of EPA and state PCB and mercury-containing lamp waste permit applications and EPA identification numbers, as required.

c. Names and qualifications (experience and training) of personnel who will be working on-site with PCB and mercury-containing lamp wastes.

d. Spill prevention, containment, and cleanup contingency measures to be implemented.

e. Work plan and schedule for PCB and mercury-containing lamp waste removal, containment, storage, transportation, disposal and or recycling. Clean up and containerize wastes daily.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 WORK PROCEDURE

Furnish labor, materials, services, and equipment necessary for the removal of PCB containing lighting ballasts, associated mercury-containing fluorescent lamps, and high intensity discharge (HID) lamps in accordance with local, state, or federal regulations. Do not expose PCBs to open flames or other high temperature sources since toxic decomposition by-products may be produced. Do not break mercury containing fluorescent lamps or high intensity discharge lamps.

3.1.1 Work Operations

Ensure that work operations or processes involving PCB or PCB-contaminated materials are conducted in accordance with 40 CFR 761, 40 CFR 262 40 CFR 263, and the applicable requirements of this section, including but not limited to:

a. Obtaining suitable PCB and mercury-containing lamp storage sites.

b. Notifying Contracting Officer prior to commencing the operation.

c. Reporting leaks and spills to the Contracting Officer.

d. Cleaning up spills.

e. Inspecting PCB and PCB-contaminated items and waste containers for leaks and forwarding copies of inspection reports to the Contracting Officer.

f. Maintaining inspection, inventory and spill records.

3.2 PCB SPILL CLEANUP REQUIREMENTS

3.2.1 PCB Spills

Immediately report to the Contracting Officer any PCB spills.

3.2.2 PCB Spill Control Area

Rope off an area around the edges of a PCB leak or spill and post a "PCB Spill Authorized Personnel Only" caution sign. Immediately transfer leaking items to a drip pan or other container.

3.2.3 PCB Spill Cleanup

40 CFR 761, subpart G. Initiate cleanup of spills as soon as possible, but no later than 24 hours of its discovery. Mop up the liquid with rags or other conventional absorbent. Properly contain and dispose of spent absorbent as solid PCB waste.

3.2.4 Records and Certification

Document the cleanup with records of decontamination in accordance with 40 CFR 761, Section 125, Requirements for PCB Spill Cleanup. Provide test results of cleanup and certification of decontamination.

3.3 REMOVAL

3.3.1 Ballasts

As ballast are removed from the lighting fixture, inspect label on ballast. Ballasts without a "No PCB" label must be assumed to contain PCBs and containerized and disposed of as required under paragraphs STORAGE FOR DISPOSAL and DISPOSAL. If there are less than 1600 "No PCB" labeled lighting ballasts, dispose of them as normal demolition debris. If there are more than 1600 "No PCB" labeled ballasts, establish whether the "No PCB" labeled ballasts contain diethylhexyl phthalate (DEHP) either by test or by checking with the ballast manufacturer indicated on the label. Submit testing results and/or written confirmation from the manufacturer to the Contracting Officer. If the ballasts do not contain DEHP, dispose of them as normal construction debris. If they do contain DEHP, dispose of them as hazardous material in accordance with Federal, State, and local regulations. As a basis of bid assume ballasts with "No PCB" labels do not contain DEHP and may disposed of as normal construction debris. If 1600 or more DEHP ballasts are disposed of in a 24 hour period, notify the National Response Team at 800-424-8802.

3.3.2 Lighting Lamps

Remove lighting tubes/lamps from the lighting fixture and carefully place (unbroken) into appropriate containers (original transport boxes or equivalent). In the event of a lighting tube/lamp breaking, sweep and place waste in double plastic taped bags and dispose of as universal waste as specified herein.

3.4 STORAGE FOR DISPOSAL

3.4.1 Storage Containers for PCBs

49 CFR 178. Store PCB in containers approved by DOT for PCB.

3.4.2 Storage Containers for lamps

Store mercury containing lamps in appropriate DOT containers. Store and label boxes for transport in accordance with 40 CFR 273.

3.4.3 Labeling of Waste Containers

Label with the following:

a. Date the item was placed in storage and the name of the cognizant activity/building.

b. "Caution Contains PCB," conforming to 40 CFR 761, CFR Subpart C. Affix labels to PCB waste containers.

c. Label mercury-containing lamp waste in accordance with 40 CFR 273. Affix labels to all lighting waste containers.

3.5 DISPOSAL

Dispose of off Government property in accordance with EPA, DOT, and local regulations at a permitted site.

3.5.1 Identification Number

Federal regulations 40 CFR 761, and 40 CFR 263 require that generators, transporters, commercial storers, and disposers of PCB waste posses U.S. EPA identification numbers. Verify that the activity has a U.S. EPA generator identification number for use on the Uniform Hazardous Waste manifest. If not, advise the activity that it must file and obtain an I.D. number with EPA prior to commencement of removal work. For mercury containing lamp removal, Federal regulations 40 CFR 273 require that large quantity handlers of Universal waste (LQHUW) must provide notification of universal waste management to the appropriate EPA Region (or state director in authorized states), obtain an EPA identification number, and retain for three years records of off-site shipments of universal waste. Verify that the activity has a U.S. EPA generator identification number for use on the Universal Waste manifest. If not, advise the activity that it must file and obtain an I.D. number with EPA prior to commencement of removal work.

3.5.2 Transporter Certification

Comply with disposal and transportation requirements outlined in 40 CFR 761 and 40 CFR 263. Before transporting the PCB waste, sign and date the manifest acknowledging acceptance of the PCB waste from the Government. Return a signed copy to the Government before leaving the job site. Ensure that the manifest accompanies the PCB waste at all times. Submit transporter certification of notification to EPA of their PCB waste activities (EPA Form 7710-53).

3.5.2.1 Certificate of Disposal and/or Recycling

40 CFR 761. Include in the certificate for the PCBs and PCB items disposed:

a. The identity of the disposal and or recycling facility, by name, address, and EPA identification number.

b. The identity of the PCB waste affected by the Certificate of Disposal including reference to the manifest number for the shipment.

c. A statement certifying the fact of disposal and or recycling of the identified PCB waste, including the date(s) of disposal, and identifying the disposal process used.

d. A certification as defined in 40 CFR 761.

-- End of Section --

SECTION 02 84 33

REMOVAL AND DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
11/22

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.

AECOM

HazMat Report	Hazardous Material Report

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

29 CFR 1910.145	Specifications for Accident Prevention Signs and Tags
29 CFR 1910.1000	Air Contaminants
40 CFR 761	Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
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 174	Carriage by Rail
49 CFR 175	Carriage by Aircraft
49 CFR 176	Carriage by Vessel
49 CFR 177	Carriage by Public Highway
49 CFR 178	Specifications for Packagings
49 CFR 179	Specifications for Tank Cars

1.2 REQUIREMENTS

The work includes the removal and disposal of PCBs. Perform work in accordance with 40 CFR 761 and the requirements specified herein.

1.3 DEFINITIONS

1.3.1 Leak

Leak or leaking means any instance in which a PCB Article, PCB Container, or PCB Equipment has any PCBs on any portion of its external surface.

1.3.2 PCBs

PCBs as used in this specification mean the same as PCBs, PCB Article, PCB Article Container, PCB Container, PCB Equipment, PCB Item, PCB Transformer, PCB-Contaminated Electrical Equipment, as defined in 40 CFR 761, Section 3, Definitions.

1.3.3 Spill

Spill means both intentional and unintentional spills, leaks, and other uncontrolled discharges when the release results in any quantity of PCBs running off or about to run off the external surface of the equipment or other PCB source, as well as the contamination resulting from those releases.

1.4 QUALITY ASSURANCE

1.4.1 Training

Instruct employees on the dangers of PCB exposure, on respirator use, decontamination, and applicable OSHA and EPA regulations.

1.4.2 Certified Industrial Hygienist (CIH)

Obtain the services of an industrial hygienist certified by the American Board of Industrial Hygiene to certify training, review and approve the PCB removal plan, including determination of the need for personnel protective equipment (PPE) in performing PCB removal work.

1.4.3 Regulation Documents

Maintain at all times one copy each at the office and one copy each in view at the job site 29 CFR 1910.1000, 40 CFR 761, and Contractor work practices for removal, storage and disposal of PCBs.

1.4.4 Surveillance Personnel

Surveillance personnel may enter PCB control areas for brief periods of time provided they wear disposable polyethylene gloves and disposal polyethylene foot covers, as a minimum. Additional protective equipment may be required if respiratory hazard is involved or if skin contact with PCB is involved.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

PCB Removal Work Plan

PCB Disposal Plan

SD-07 Certificates

Training certification

Qualifications of CIH

Notification

Transporter Certification of notification to EPA of their PCB waste activities and EPA ID numbers

Certification of Decontamination for PCB Spill

Post Cleanup Sampling Data

Certificate of Disposal

1.6 EQUIPMENT

1.6.1 Special Clothing

Work clothes consist of PPE as required by OSHA regulations, including, but not limited to the following:

a. Disposable coveralls

b. Gloves (Disposable rubber gloves may be worn under these)

c. Disposable foot covers (polyethylene)

d. Chemical safety goggles

e. Half mask cartridge respirator.

1.6.2 Special Clothing for Government Personnel

Provide PPE specified in paragraph SPECIAL CLOTHING to the Contracting Officer as required for inspection of the work.

1.6.3 PCB Spill Kit

Assemble a spill kit to include the following items:

ITEM	MINIMUM QUANTITY
1. Disposable gloves (polyethylene)	6 prs
2. Gloves with a high degree of impermeability to PCB	6 prs

3. Disposable coveralls with permeation resistance to PCB	4 ea
4. Chemical safety goggles	2 ea
5. Disposable foot covers (polyethylene)	6 prs
6. PCB Caution Sign: "PCB Spill--Authorized Personnel Only"	2 ea
7. Banner guard or equivalent banner material	100 feet
8. Absorbent material	5 bags
9. Blue polyethylene waste bags	5 ea
10. Cloth backed tape	1 roll
11. Area access logs, blank	10 ea
12. Brattice cloth, 6' x 6'	1 piece
13. Rags	20 ea
14. Ball point pens	20 ea
15. Herculite, 4' x 4' and 8' x 8'	2 ea and 1 ea
16. Blank metal signs and grease pencils	2 ea
17. Waste containers 55 gallon drum, may be used as container for kit	1 ea

1.7 QUALITY ASSURANCE

1.7.1 Training Certification

Submit certificates, prior to the start of work but after the main abatement submittals, signed and dated by the CIH and by each employee stating that the employee has received training. Organize certificates by individual worker, not grouped by type of certificates.

1.7.2 Qualifications of CIH

Submit the name, address, and telephone number of the Industrial Hygienist selected to perform the duties in paragraph CERTIFIED INDUSTRIAL HYGIENIST. Submit proper documentation that the Industrial Hygienist is certified, including certification number and date of certification/recertification.

1.7.3 PCB Removal Work Plan

Submit a detailed job-specific plan of the work procedures to be used in the removal of PCB-containing materials, not to be combined with other

hazardous abatement plans. Provide a Table of Contents for each abatement submittal which follows the sequence of requirements in the contract. Include in the plan a sketch showing the location, size, and details of PCB control areas. Include in the plan, eating, drinking, smoking and restroom procedures, interface of trades, sequencing of PCB related work, PCB disposal plan, respirators, protective equipment, and a detailed description of the method of containment of the operation to ensure that PCB contamination is not spread or carried outside of the control area. Include provisions to ensure that airborne PCB concentrations of 3.10 E-08 pound per cubic feet of air are not exceeded outside of the PCB control area. Include air sampling, training and strategy, sampling methodology, frequency, duration of sampling, and qualifications of air monitoring personnel in the air sampling portion of the plan. Obtain approval of the plan prior to the start of PCB removal work. The AECOM HazMat Report contains PCB test results from screening level testing.

1.7.4 PCB Disposal Plan

Submit a PCB Disposal Plan within 45 calendar days after award of contract for Contracting Officer's approval. Comply with applicable requirements of Federal, State, and local PCB waste regulations and address:

a. Identification of PCB wastes associated with the work.

b. Estimated quantities of wastes to be generated and disposed of.

c. Names and qualifications of each contractor that will be transporting, storing, treating, and disposing of the wastes. Include the facility location and a 24-hour point of contact. Furnish two copies of EPA PCB waste permits and EPA Identification numbers.

d. Names and qualifications (experience and training) of personnel who will be working on-site with PCB wastes.

e. List of waste handling equipment to be used in performing the work, to include cleaning, volume reduction, and transport equipment.

f. Spill prevention, containment, and cleanup contingency measures to be implemented.

g. Work plan and schedule for PCB waste containment, removal and disposal. Clean up and containerize wastes daily.

1.7.5 Notification

Notify the Contracting Officer 20 days prior to the start of PCB removal work.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 PROTECTION

3.1.1 Decontamination Room, Clean Room and Shower Facilities

a. Provide material and labor for construction of a decontamination room,

a clean room, and shower facilities. Provide rooms with doors and attach to the exit ways of PCB work areas. Provide rooms of sufficient size to accommodate the Contractor's operation within. Existing facilities with water closets, urinals, wash basins and showers may be used if available. Provide separate clothing lockers or containers in each room to prevent contamination of street and work clothes.

b. Remove PCB-contaminated PPE in the decontamination room before proceeding to showers. Workers must shower before lunch and at the end of each day's work. Hot water, towels, soap, and hygienic conditions are the responsibility of the Contractor.

3.1.2 PCB Control Area

Isolate PCB control area by physical boundaries to prevent unauthorized entry of personnel. Food, drink and smoking materials are not permitted in areas where PCBs are handled or PCB items are stored.

3.1.3 Personnel Protection

Workers must wear and use PPE, as recommended by the Industrial Hygienist, upon entering a PCB control area. If PPE is not required per the CIH, specify in the PCB removal work plan.

3.1.4 Footwear

Work footwear remains inside work area until completion of the job.

3.1.5 Permissible Exposure Limits (PEL)

PEL for PCBs is 3.1 E-08 lb/cubic foot on an 8-hour time weighted average basis.

3.1.6 Special Hazards

a. Do not expose PCBs to open flames or other high temperature sources since toxic decomposition by-products may be produced.

b. Do not heat PCBs to temperatures of 135 degrees F or higher without Contracting Officer's concurrence.

3.1.7 PCB Caution Label

40 CFR 761, Subpart C. Affix labels to PCB waste containers and other PCB-contaminated items. Provide label with sufficient print size to be clearly legible, with bold print on a contrasting background, displaying the following: CAUTION: Contains PCBs (Polychlorinated Biphenyls).

3.1.8 PCB Caution Sign

29 CFR 1910.145. Provide signs at approaches to PCB control areas. Locate signs at such a distance that personnel may read the sign and take the necessary precautions before entering the area.

3.2 WORK PROCEDURE

Furnish labor, materials, services, and equipment necessary for the complete removal of PCBs located at the site as indicated or specified in

accordance with local, State, or Federal regulations. Package and mark PCB as required by EPA and DOT regulations and dispose of off Government property in accordance with EPA, DOT, and local regulations at a permitted site.

3.2.1 No Smoking

Smoking is not permitted within 50 feet of the PCB control area. Provide "No Smoking" signs as directed by the Contracting Officer.

3.2.2 Work Operations

Ensure that work operations or processes involving PCB or PCB-contaminated materials are conducted in accordance with 40 CFR 761 and the applicable requirements of this section, including but not limited to:

a. Obtaining advance approval of PCB storage sites.

b. Notifying Contracting Officer prior to commencing the operation.

c. Reporting leaks and spills to the Contracting Officer.

d. Cleaning up spills.

e. Maintaining an access log of employees working in a PCB control area and providing a copy to the Contracting Officer upon completion of the operation.

f. Inspecting PCB and PCB-contaminated items and waste containers for leaks and forwarding copies of inspection reports to the Contracting Officer.

g. Maintaining a spill kit as specified in paragraph PCB SPILL KIT.

h. Maintaining inspection, inventory and spill records.

3.3 PCB TRANSFORMERS

3.3.1 Draining of Transformer Liquid

Perform work in accordance with 49 CFR 171, 49 CFR 172, 49 CFR 173, 49 CFR 174, 49 CFR 175, 49 CFR 176, 49 CFR 177, 49 CFR 178, and 49 CFR 179, Subchapter C and as specified herein. Drain the transformer, switches, and regulators of free flowing liquid prior to transportation. Place the drained liquids in DoT Spec drums. The drums must not contain more than 50 gallons of oil. If the equipment cannot be drained, then place it in DoT Spec drums. DoT drum specifications must meet UN 1A1/Y1.6 (steel drum) or UN 1H1/Y1.6 (plastic drum).

3.3.2 Markings

Provide drums and drained PCB-contaminated electrical equipment with caution label markings as specified in paragraph PCB CAUTION LABEL.

3.3.3 Laboratory Analysis

Provide all transformers with a laboratory analysis for turn-in. DLA DS prefers a gas chromatograph test. The only two exceptions to this rule are:

a. The transformer is hermetically sealed (solder sealed or fusion sealed. No access ports or openings).

b. The name plate states that the transformer contains Pyranol, Interteen, etc.

Attach a copy of the lab analysis to both the DD 1348-1 and the transformer itself.

3.3.4 Markings

3.3.4.1 Transformers, Less Than 50 ppm

Add absorbent material to absorb residue oil remaining after draining. Write the date drained on the transformer. Turn in transformers to DLA DS.

3.3.4.2 Transformers, 50-499 ppm

Same procedure as transformers in the less than 50 ppm range.

3.3.4.3 Transformers, Greater Than 500 ppm

Stencil date drained on the transformer. Turn in transformer to DLA DS.

3.3.4.4 Drums

Stencil on DOT-approved 55 gallon drums containing PCB liquid the following:

a. ppm

b. Date drum filled

c. Serial number of transformer liquid came from

d. National Stock Number

(1) "9999-00-OIL" for <50 ppm

(2) "9999-00-CONPCB" for 50-499 ppm

(3) "9999-00-PCBOIL" for >500 ppm

Do not mix different ppms in the same drum. Drums must have a 2 inch ullage space from the top of the drum.

3.4 PCB REMOVAL

Select PCB removal procedure to minimize contamination of work areas with PCB or other PCB-contaminated debris/waste. Handle PCBs such that no skin contact occurs. PCB removal process should be described in the work plan.

3.4.1 Confined Spaces

As feasible, do not carry out PCB handling operations in confined spaces. A confined space means a space having limited means of egress and inadequate cross ventilation.

3.4.2 Control Area

Establish a PCB control area around the PCB item as specified in paragraph PCB CONTROL AREA. Only personnel briefed on the elements in the paragraph TRAINING and on the handling precautions are allowed into the area.

3.4.3 Exhaust Ventilation

If used, discharge exhaust ventilation for PCB operations to the outside and away from personnel.

3.4.4 Temperatures

As feasible, handle PCBs at ambient temperatures and not at elevated temperatures.

3.4.5 Solvent Cleaning

Clean contaminated tools, containers, etc., after use by rinsing three times with an appropriate solvent or by wiping down three times with a solvent wetted rag. Suggested solvents are Stoddard solvent or hexane.

3.4.6 Drip Pans

Drip pans are required under portable PCB transformers and rectifiers in use or stored for use. Provide the pans with a containment volume of at least one and one-half times the internal volume of PCBs in the item.

3.4.7 Evacuation Procedures

Provide written procedures for evacuation of injured workers. Do not delay aid for a seriously injured worker for reasons of decontamination.

3.5 PCB SPILL CLEANUP REQUIREMENTS

3.5.1 PCB Spills

Immediately report to the Contracting Officer any PCB spills on the ground or in the water, PCB spills in drip pans, or PCB leaks.

3.5.2 PCB Spill Control Area

Rope off an area around the edges of a PCB leak or spill and post a "PCB Spill Authorized Personnel Only" caution sign. Immediately transfer leaking items to a drip pan or other container.

3.5.3 PCB Spill Cleanup

40 CFR 761, Subpart G. Initiate cleanup of spills as soon as possible, but no later than 48 hours of its discovery. If misting, elevated temperatures or open flames are present, or if the spill is situated in a confined space, notify the Contracting Officer. Mop up the liquid with rags or other conventional absorbent. Properly contain and dispose of spent absorbent as solid PCB waste.

3.5.4 Records and Certification

Document the cleanup with records of decontamination in accordance with 40 CFR 761, Section 125, Requirements for PCB Spill Cleanup. Provide

certification of decontamination.

3.5.5 Sampling Requirements

Perform post cleanup sampling as required by 40 CFR 761, Section 130, Sampling Requirements. Do not remove boundaries of the PCB control area until site is determined satisfactorily clean by the Contracting Officer.

3.6 STORAGE FOR DISPOSAL

3.6.1 Storage Containers for PCBs

49 CFR 178. Store liquid PCBs in Department of Transportation (DOT) Specification 17E containers. Store nonliquid PCB mixtures, articles, or equipment in DOT Specification 5, 5B, or 17C containers with removable heads.

3.6.2 Waste Containers

Label with the following:

a. "Solid (or Liquid) Waste Polychlorinated Biphenyls"

b. The PCB Caution Label, paragraph PCB CAUTION LABEL

c. The date the item was placed in storage and the name of the cognizant activity/building.

3.6.3 PCB Articles and PCB-Contaminated Items

Label with items b. through c. above.

3.6.4 Approval of Storage Site

Obtain in advance Contracting Officer approval using the following criteria without exception.

a. Adequate roof and walls to prevent rainwater from reaching the stored PCBs.

b. An adequate floor which has continuous curbing with a minimum 6 inch high curb. Such floor and curbing must provide a containment volume equal to at least two times the internal volume of the largest PCB article or PCB container stored therein or 25 percent of the total internal volume of all PCB equipment or containers stored therein, whichever is greater.

c. No drain valves, floor drains, expansion joints, sewer lines, or other openings that would permit liquids to flow from the curbed area.

d. Floors and curbing constructed of continuous smooth and impervious materials such as portland cement, concrete or steel to prevent or minimize penetrations of PCBs.

e. Not located at a site which is below the 100-year flood water elevation.

f. Post each storage site with the PCB Caution Sign, paragraph PCB CAUTION SIGN.

3.7 CLEANUP

Maintain surfaces of the PCB control area free of accumulations of PCBs. Restrict the spread of dust and debris; keep waste from being distributed over work area.

Do not remove the PCB control area and warning signs prior to the Contracting Officer's approval. Reclean areas showing residual PCBs.

3.8 DISPOSAL

Comply with disposal requirements and procedures outlined in 40 CFR 761. Do not accept PCB waste unless it is accompanied by a manifest signed by the Government. Before transporting the PCB waste, sign and date the manifest acknowledging acceptance of the PCB waste from the Government. Return a signed copy to the Government before leaving the job site. Ensure that the manifest accompanies the PCB waste at all times. Submit transporter certification of notification to EPA of their PCB waste activities.

3.8.1 Certificate of Disposal

40 CFR 761. Submit to the Government within 30 days of the date that the disposal of the PCB waste identified on the manifest was completed. Include in the certificate for the PCBs and PCB items disposed:

a. The identity of the disposal facility, by name, address, and EPA identification number.

b. The identity of the PCB waste affected by the Certificate of Disposal including reference to the manifest number for the shipment.

c. A statement certifying the fact of disposal of the identified PCB waste, including the date(s) of disposal, and identifying the disposal process used.

d. A certification as defined in 40 CFR 761, Section 3.

3.8.1.1 Payment Upon Furnishing Certificate of Disposal of PCBs

Payment will not be made until the certificate of disposal has been furnished to the Contracting Officer.

-- End of Section --

SECTION 02 85 00

MOLD REMEDIATION
08/25

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.

AECOM

HazMat Report	Hazardous Material Report

AMERICAN INDUSTRIAL HYGIENE ASSOCIATION (AIHA)

AIHA IMOM08-679	(2008) Recognition, Evaluation, and Control of Indoor Mold

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP Z9.2	(2018) Fundamentals Governing the Design and Operation of Local Exhaust Ventilation Systems

INSTITUTE OF INSPECTION, CLEANING, AND RESTORATION CERTIFICATION (IICRC)

ANSI/IICRC S520	(2015) Standard and Reference Guide for Professional Mold Remediation
IICRC S100	(2015) S100 Standard and R100 Reference Guide for Professional Cleaning of Textile Floor Covering
IICRC S500	(2015) Standard and Reference Guide for Professional Water Damage Restoration

NATIONAL AIR DUCT CLEANERS ASSOCIATION (NADCA)

NADCA ACR	(2021) Standard for Assessment, Cleaning, and Restoration of HVAC Systems

NATIONAL ASSOCIATION OF MOLD REMEDIATORS AND INSPECTORS (NAMRI)

NAMRI APR	Accreditation Program Requirements, Latest Edition

NAVY AND MARINE CORPS PUBLIC HEALTH CENTER (NMCPHC)

IHFOM, CH 13, Sec. 3	(2019) Mold Cleanup, Remediation, and Clearance Sampling

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

29 CFR 1910.134	Respiratory Protection
29 CFR 1926.59	Hazard Communication
29 CFR 1926.62	Lead
29 CFR 1926.1101	Asbestos
29 CFR 1926.1126	Chromium
29 CFR 1926.1127	Cadmium

UL SOLUTIONS (UL)

UL 586	(2009; Reprint Sep 2022) UL Standard for Safety High-Efficiency Particulate, Air Filter Units

1.2 DEFINITIONS

1.2.1 AIHA

American Industrial Hygiene Association.

1.2.2 AIHA EMLAP

American Industrial Hygiene Association's Environmental Microbiology Laboratory Accreditation Program

1.2.3 AFU

Air filtration unit with High Efficiency particulate air (HEPA) filtered vacuum and exhaust ventilation equipment with a filter system capable of collecting and retaining microbial contamination ASSP Z9.2. Filters must retain 99.97 percent of particles 0.000012 inches or larger as indicated in UL 586.

1.2.4 Categories of Water

Category 1 Water: Water that originates from a sanitary water source and does not pose a substantial risk from dermal, ingestion, or inhalation exposure. IICRC S500

Category 2 Water: Water that contains significant contamination and has the potential to cause discomfort or sickness if contacted or consumed by humans. Can contain potentially unsafe levels of microorganisms or nutrients for microorganisms as well as other organic or inorganic matter. IICRC S500

Category 3 Water: Water that is grossly contaminated and can cause significant adverse reactions to humans if contacted or consumed. IICRC S500

1.2.5 Certified Industrial Hygienist (CIH)

An individual that has been certified by the Board for Global EHS Credentialing (BGC), formerly known as the American Board of Industrial

Hygiene (ABIH), with professional qualifications and experience as required for an industrial hygienist, as presented in the definition of "Industrial Hygienist."

1.2.6 Complete Interior Building Demolition (Complete Gut)

Interior finishes of the building have been removed to expose basic structural elements.

1.2.7 Containment

Physical separation and engineering controls required to prevent contamination of undamaged materials and occupied areas. The level of containment varies depending on the extent of the contamination.

1.2.7.1 Source Containment

Use when the contaminated surface area is less than 10 square feet, in both residential and non-residential buildings. At a minimum, source containment must include the following (ANSI/IICRC S520):

a. Isolation of Work Areas. Install polyethylene barriers to isolate the areas or material to be demolished / remediated from non-remediation areas.

b. Floor protection. Maintain protection for finished floors through all construction activities.

c. HEPA vacuum to control dust created during the demolition. Hold HEPA vac intake at source of dust.

1.2.7.2 Limited Containment

Use when contaminated surface area is between 10 square feet and 100 square feet per room in both residential and non-residential buildings. At a minimum, limited containment includes the following (ANSI/IICRC S520):

a. Containment. For residential buildings, a containment includes the entire room where work is being performed. The containment does not extend past the extents of the room unless there are instances of contamination extending from one room to the next. For non-residential buildings, the containment includes the area to be remediated, plus enough additional area to allow for all equipment and work activities.

b. Isolation of Work Areas. Install polyethylene barriers to isolate the areas to be demolished / remediated.

c. Floor protection. Maintain protection for finished floors through all construction activities.

d. Air Filtration / Pressurization Control. Install AFUs with HEPA filters in the containment. Configure the AFUs with splitters / diverters to allow some of the air to recirculate within the containment. Discharge the remainder of the air directly to the outside to maintain an overall negative pressure in the containment of 0.02 inch water column minimum to 0.04 inch water column maximum relative to the outside and other adjacent spaces not undergoing remediation(AIHA IMOM08-679). AFUs must filter a minimum of four air

changes per hour and a maximum of six air changes per hour (ANSI/IICRC S520).

e. Protection for all items remaining in the containment. Protective devices or polyethylene wrapping or both must prevent physical damage (e.g., scratches and dents) and must provide a positive seal to prevent dust from settling in or on the items.

f. Decontamination. Construct a decontamination airlock for entry into and exit from the work area. HEPA vacuum the sealed bags of contaminated debris within the airlock. When possible, locate the decontamination airlock so that the sealed bags can be passed directly from the airlock to the outside, through a door or window.

g. Containment Entrance. Install a triple-flap poly "door" to be used during demolition to provide a good separation between containment and occupied areas of the house / building.

h. HVAC System. Seal off all supply and return vents. HVAC may need to be shut down to ensure proper seal of the vents.

1.2.7.3 Full Containment

Use when contaminated surface area is greater than 100 square feet in both residential and nonresidential buildings. At a minimum, full containment includes the following(ANSI/IICRC S520):

a. Containment. For residential buildings, a containment includes the entire room where work is being performed. The containment does not extend past the extents of the room unless there are instances of contamination extending from one room to the next. For non-residential buildings, the containment includes the area to be remediated, plus enough additional area to allow for all equipment and work activities.

b. Isolation of Work Areas. Construct polyethylene barriers to isolate the areas to be demolished / remediated.

c. Floor protection. Maintain protection for finished floors through all construction activities.

d. Air Filtration / Pressurization Control. Install AFUs with HEPA filters in the containment. Configure the AFUs with splitters / diverters to allow some of the air to recirculate within the containment. Discharge the remainder of the air directly to the outside to maintain an overall negative pressure in the containment of 0.02 inch water column minimum to 0.04 inch water column maximum relative to the outside and other adjacent spaces not undergoing remediation (AIHA IMOM08-679). AFUs must filter a minimum of four air changes per hour and a maximum of six air changes per hour (ANSI/IICRC S520).

e. Protection for all items remaining in the containment. Protective devices or polyethylene wrapping, or both must prevent physical damage (e.g., scratches and dents) and must provide a positive seal to prevent dust from settling in or on the items.

f. Decontamination. Construct a decontamination airlock for entry into and exit from the work area. HEPA vacuum the sealed bags of

contaminated debris within the airlock. When possible, locate the decontamination airlock so that the sealed bags can be passed directly from the airlock to the outside, through a door or window.

g. Containment Entrance. Install a triple-flap poly "door" at the entrance to the airlock, and between the airlock and the work area during demolition to provide a good separation between containment and occupied areas of the house / building.

h. HVAC System. Seal off all supply and return vents. HVAC may need to be shut down to ensure proper seal of the vents.

1.2.7.4 Unoccupied Building Containment

Use when a building is unoccupied and large amounts of mold growth are present throughout the building:

a. Containment. The containment consists of the entire building. Install AFUs with HEPA filters in the building. Configure the AFUs to recirculate within the active remediation area. AFUs must filter a minimum of four air changes per hour and a maximum of six air changes per hour based on the size of the area undergoing active remediation (ANSI/IICRC S520).

b. Isolation of Work Areas. Install polyethylene barriers to isolate remediation areas from non-remediation areas. AFU discharge may be used to positively pressurize non-remediation areas from areas undergoing remediation to prevent the movement of spores into "clean" areas.

c. Floor Protection. Maintain protection for finished floors through all construction activities.

d. Protection for all items remaining in the containment. Protective devices or polyethylene wrapping, or both must prevent physical damage (e.g., scratches and dents) and must provide a positive seal to prevent dust from settling in or on the items.

e. Decontamination. Construct a decontamination airlock for entry into and exit from the building.

f. Containment Entrance. Install a triple-flap poly "door" to be used during demolition to provide a good separation between containment and non-remediation areas of the house / building.

g. HVAC System. Seal off all supply and return vents. HVAC may need to be shut down to ensure proper seal of the vents.

1.2.7.5 Cleaning Containment

For items being salvaged, set up a temporary containment structure to clean items removed from the containment. At a minimum, the cleaning area must contain:

a. Two chambers. Construct walls with polyethylene. Clean the items in the first chamber. Store the clean items in the second chamber.

b. Air Filtration / Pressurization Control Cleaning Chamber. Install AFUs with HEPA filters in the cleaning chamber. Configure the AFUs

with splitters / diverters to allow some of the air to recirculate within the containment. Discharge the remainder of the air directly to the outside to maintain an overall negative pressure in the containment of 0.02 inch water column minimum to 0.04 inch water column (maximum) relative to the storage chamber (AIHA IMOM08-679).

c. Air Filtration, Storage Chamber. Install AFUs with HEPA filters in the storage chamber. Configure the AFUs to allow air to recirculate within the chamber. AFUs must provide air filtration at a rate of between four and six air changes per hour (ANSI/IICRC S520).

d. Containment Entrance. Install a triple-flap polyethylene "door" at the entrance to the cleaning chamber, between the cleaning and storage chambers, and at the exit of the storage chamber to provide a good separation between the chambers.

1.2.8 Decontamination Unit (Airlock)

An enclosed area adjacent to, and connected to, a regulated work area. It consists of various rooms that are used for the decontamination of workers, equipment, and materials.

1.2.9 Dehumidifier

Mechanism or machine to remove moisture from the air.

1.2.10 Detergent

A cleaning agent. The term refers to a prepared compound that may include surfactants, builders, dry solvents, softeners, etc, but does not include true soap.

1.2.11 Disinfectants or Biocide Sanitizing Solutions

One of three groups of antimicrobials registered by the EPA for public health uses. The EPA considers an antimicrobial to be a disinfectant when it destroys or irreversibly inactivates infectious or other undesirable organisms, but not necessarily their spores.

1.2.12 EPA

U.S. Environmental Protection Agency.

1.2.13 Fungal Growth Structures

Portions of fungi indicating active fungal growth is present on a surface. These include spores, conidiophores, hyphae, hyphal fragments, and mycelium.

1.2.14 Fungicidal Agents, (EPA)

An EPA registered fungicide that inhibits the spread and growth of mold with the ability to withstand moist and humid conditions.

1.2.15 HEPA Filter

A High Efficiency Particulate Air (HEPA) filter capable of trapping and retaining 99.97 percent of all particulate larger than 0.000012 inches.

1.2.16 HVAC

Heating, Ventilating, and Air Conditioning (System).

1.2.17 Industrial Hygienist (IH)

An individual designated and provided by the Contractor that is a professional qualified by education, training, and experience to anticipate, recognize, evaluate, and develop controls for occupational and indoor air quality hazards. Education must include a minimum 12 semester hours or quarter hour equivalent of chemistry and 18 additional semester hours or quarter hour equivalent of courses in any combination of chemistry, physics, engineering, health physics, environmental health, biostatistics, biology, physiology, toxicology, epidemiology, or industrial hygiene. The Industrial Hygienist must be a CIH or working under the supervision of a Certified Industrial Hygienist.

1.2.18 Microbial Remediation Supervisor

Individual responsible for the execution of the microbial remediation work as defined by the scope of work. This individual must have documented training in microbial remediation and have at least 3 years of experience in microbial remediation work. Remediation contractor's on-site supervisor must have one of the following certifications: Council-Certified Microbial Remediator (CMR), or Council-Certified Microbial Remediation Supervisor (CMRS) as certified by the American Council for Accredited Certification, or Applied Microbial Remediation Specialist (AMRS), Institute of Inspection, Cleaning, and Restoration Certification (IICRC) or Contracting Officer approved equivalent.

1.2.19 NADCA

National Air Duct Cleaners Association

1.2.20 NAMRI

National Association of Mold Remediators and Inspectors

1.2.21 Non-Porous Material

A material that does not absorb nor is easily penetrated by liquids, especially water. Generally, non-porous materials have a permeable factor of less than one. Some examples are metal, glass, plastic, ceramic tile.

1.2.22 Occupied Spaces (Areas)

The phrase "occupied space" within this specification refers to spaces that are occupied by unprotected non-remediation personnel while work is in progress. It also refers to areas adjacent to work areas that are not currently undergoing remediation.

1.2.23 Personal Protective Equipment (PPE)

Any material or device worn to protect a worker from exposure to, or contact with, any harmful material or force. Standard PPE (such as hard hats, safety glasses, work boots, gloves) must be cleaned or disposed of prior to removal from the remediation work area.

1.2.24 Poly

Polyethylene sheet with a minimum thickness of 6 mils (IHFOM, CH 13, Sec. 3).

1.2.25 Porous Material

Permeable materials having the physical properties that allow liquids or gasses to pass through. These materials include but are not limited to the following: gypsum wall board, insulation, wallpaper, ceiling material, carpet, padding, paper goods (i.e., cardboard boxes, loose paper, books), stuffed furniture, wicker, fabrics.

1.2.26 Pressure Differential Measuring Instrument

Device used to measure the relative pressure difference between the work area/containment and areas outside the work area. For mold remediation, the device must measure accurately in the 0 to 0.04 inch of water range.

1.2.27 Semi-porous Material

A material that can absorb liquids if exposed over long periods of time. These materials include but are not limited to wood, concrete, linoleum, vinyl wall covering, wooden or hardboard furniture, plaster.

1.2.28 Ventilation System Mold Remediator Qualifications (VSMR)

An individual certified by the National Air Duct Cleaners Association (NADCA) to clean HVAC systems.

1.2.29 Work Area

The area where remediation operations are actively performed and controlled to prevent the spread of dust / spores and entry by unauthorized personnel. A work area is the space, group of spaces, or the building, as defined by the Microbial Assessment Survey.

1.3 REQUIREMENTS

1.3.1 Description of Work

The Contracting Officer will furnish the Contractor, in the contract documents, an initial Microbial Assessment Survey with containment categories and remediation methods specified for each work area and material within the work area. The AECOM HazMat Report visually identified areas containing mold.

a. The Contracting Officer's initial Microbial Assessment Survey specified below must be furnished and certified by a qualified assessor authorized by the Contracting Officer to do such work. The initial survey is included in the solicitation documents at the end of this specification section.

b. Provide mold remediation work including the handling and control of mold contaminated materials and the resultant procedures and equipment required to protect workers, the environment and occupants of the building or area, or both, from contact with mold products and spores. The work also includes the disposal of any mold contaminated materials generated by the work. Provide containment and engineering

control techniques as outlined in this specification. All mold contaminated material removal work must be supervised by a microbial remediation supervisor as specified herein.

c. No work in this specification section can be provided by any person, contractor, or contracting entity involved in the preparation of the contract documents of which this specification section is a part.

d. The following microbial remediation specifications apply to the cleaning / removal and disposal of fungally-contaminated porous, semi-porous and non-porous surfaces within various types of structures. The level of containment and requirements for cleaning and remediation of materials depends on the condition of the space and materials being remediated.

e. Immediately after award of the contract, prepare a preliminary visual assessment report using the standard microbial assessment form (Appendix A) to document the differences in the pre-remediation condition of the work areas as compared to the government provided Microbial Assessment Survey.Coordinate inspection with contracting officer. Only address the differences between the pre-remediation condition of the work areas and the government provided Microbial Assessment Survey. If required to indicate the differences, include the HVAC systems inspection required elsewhere in this specification section. Submit this written pre-remediation condition report to the Contracting Officer for approval and instructions to proceed.

f. After approval of the preliminary visual assessment report and having instructions from the Contracting Officer to proceed, prepare a microbial remediation plan for approval by the Contractor's Certified Industrial Hygienist. Include an assessment of the risk for people occupying areas adjoining the remediation area while remediation work is occurring in the microbial remediation plan. Upon the Contractor's CIH approval of the plan, submit the plan to the Contracting Officer for approval.

g. The Contractor's CIH or IH must monitor the site on a daily basis while remediation work is in progress, identifying work and work practices that are not in compliance with the approved microbial remediation plan, and performing all inspections required by this specification. The Contracting Officer may require the removal of any individual for non-compliance with quality requirements specified in the contract.

h. This specification section includes the protocol regarding proper disposal of the removed building material components from within the work site.

i. Use proper cleaning procedures, engineering controls, and apply best management practices to remove microbial growth and spore fallout from all surfaces and building materials to minimize the further release of microbial spores. Address semi-porous and nonporous surfaces within the facility in each cleaning phase of the project. Damp wipe and HEPA vacuum all surfaces, at a minimum. Remove and dispose of porous building materials that are supporting microbial growth.

1.3.2 Security Requirements

Prior to granting access to any work area (i.e., building, area, room, or

space) for mold remediation work, a determination will be made by the government agency whether classified or controlled unclassified information (paper material or electronic media) or equipment is contained in the work area(s).

It may be necessary depending on the sensitivity of the work area or the information contained in the area to authorize the Government activity or tenant command responsible for the work area to provide their own appropriately cleared military or government personnel to properly remove or secure any classified or controlled unclassified information, electronic media or equipment located in their work area(s). Prior authorization would be required and the area would need to be evaluated to ensure it is safe for personnel to enter and all personnel must utilize the required PPE to safely enter the work area.

a. If Contractor personnel require access to classified information or spaces to perform mold remediation work, the Government will issue the Contractor facility a Facility Clearance Level (FCL) (Contract Security Classification Specification) prior to the initiation of the work under the contract. If the Contractor facility does not possess a valid FCL issued by the Defense Security Service (DSS), the Government will be required to submit a sponsorship request to DSS requesting that the Contractor be processed for and issued a current FCL at the appropriate level.

b. Access to classified information (paper material, electronic media, and equipment) will only be granted to authorized and appropriately cleared government and U.S. contractor personnel that possess a personnel security clearance commensurate with the level of information contained in the work area that requires a mold remediation effort.

c. Access to Controlled Unclassified information (i.e., For Official Use Only, Sensitive but Unclassified, Privacy Act Information, Export Controlled unclassified) can be granted to DOD cleared contractors, consultants and grantees that are conducting official business for the DOD or DON. Non-cleared U.S. contractor personnel who only require access to controlled unclassified information can be granted access if they get a favorable trustworthiness determination on an individual Favorable Tier 1 investigation and fingerprint result submitted on their behalf by the government agency issuing the contract.

d. Classified information and controlled unclassified information must be safeguarded / secured, reproduced, and destroyed in accordance with SECNAV M-5510.36.

1.4 SUBMITTALS

GGovernment approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Ventilation System Mold Remediator Qualifications (VSMR); G

Preliminary Visual Assessment Report; G

Microbial Remediation Plan; G

Respiratory Protection Program; G

Worker Records;

Certified Industrial Hygienist (CIH)/Industrial Hygienist (IH) Qualifications; G

Microbial Remediation Supervisor Qualifications; G

SD-03 Product Data

Disinfectants or Biocide Sanitizing Solutions; G

Fungicidal Agents, (EPA); G

Personal Protective Equipment (PPE); G

Pressure Differential Measuring Instrument;

Safety Data Sheets (SDS) for All Materials; G

Dehumidifiers;

Air Filtration Units;

SD-06 Test Reports

IH Daily Reports; G

SD-11 Closeout Submittals

Submittals at Completion of Remediation Work; G

1.4.1 Preconstruction Submittals

Within 10 days from the award of the contract and prior to the start of the work, submit to the Contracting Officer six copies of the following items for review and permanent file.

1.4.1.1 Preliminary Visual Assessment Report

A written report to document the pre-remediation condition of the work areas compared to the government provided Microbial Assessment Survey and the results of the HVAC systems inspection.

1.4.1.2 Microbial Remediation Plan

Submit a job-specific, abbreviated plan approved by the Contractor's CIH to the Contracting Officer for final approval prior to start of work. Address the following items in the plan at a minimum:

a. Description of materials to be remediated, providing location and quantities (map if available), and methods to be used for remediation.

b. Products: Disinfectants, detergents, biocides, sanitizing solutions, and fungicidal agents, (EPA).

c. Containment procedures to include description and locations of engineering controls and decontamination unit to include entry and exit procedures (provide sketch of floor plan showing location of containment barriers and decontamination units). Include locations of AFUs and AFU discharges to the outside.

d. Description of personal protective equipment to be used during the remediation.

e. Construction barricades and barriers in occupied areas.

f. HVAC Shut down and start-up procedures.

g. HVAC Evaluation and remediation procedures.

h. Moisture and relative humidity control procedures and equipment.

i. Packaging and disposal procedures.

j. Safety Precautions to include lockout / tag-out, fall protection, confined space entry procedures, and fire protection.

k. Description of the method to be employed to control cross contamination of areas not in the work area. Include a risk assessment related to the suitability of people to occupy areas adjoining the remediation area while remediation activities are ongoing.

l. IH Quality Control procedures to include visual inspection.

m. Procedures to control, abate, and dispose of Asbestos Containing Materials (ACM), Presumed Asbestos Containing Materials (PACM) and Lead Based Paint (LBP) coincident with microbial remediation. Identify ACM, PACM, and LBP before work begins; Identify the presence, location, and quantity of ACM,PACM, and LBP therein pursuant to paragraphs (g),(k)(1) of 29 CFR 1926.1101 and for lead 29 CFR 1926.62.

1.4.1.3 Respiratory Protection Program

Provide written copy of Contractor's Respiratory Protection program.

1.4.1.4 Worker Records

Provide the following documents for all workers, including supervisory personnel. If new workers are added to the crew, provide the same documentation for them.

a. Employee Fit test records and Physician medical evaluation approval records.

b. Employee Instruction and Release Form: Provide documentation showing that each employee has been instructed on the following items:

(1) Use and fit of respirators (for employees entering and working in the containment).

(2) Protective clothing.

(3) Protective measures.

(4) Safety and Emergency Egress Procedures.

(5) Site specific plans and training such as fall protection, Lock out/tag out, confined space, or other appropriate safety and health programs that address specific risks of the affected work areas.

(6) Microbial remediation hazards and practices including engineering controls and isolation. Training should include "hands on" training for microbial remediation supervisors.

(7) Workers' release forms stating the potential hazards involved with the scope of the work.

c. Worker Training Certification: Submit copies of training certificates for each employee indicating that the employee has received training at the appropriate level for the work prescribed in the description of work.

1.4.1.5 Certified Industrial Hygienist (CIH)/Industrial Hygienist (IH) Qualifications

Submit the name, address, and telephone number of the Certified Industrial Hygienist (CIH) and Industrial Hygienist (IH). Provide copies of board certificates, resume to document field experience, and evidence that the CIH and IH have successfully completed training in microbial investigation and remediation.

1.4.1.6 Microbial Remediation Supervisor Qualifications

Onsite supervisor must have one of the following certifications: Certified Microbial Remediator (CMR), Certified Microbial Remediation Supervisor (CMRS), or Applied Microbial Remediation Specialist (AMRS). Submit copies of supervisory training certificates.

1.4.2 Product Data

Within 10 days of contract award, submit product data for items identified for use in Microbial Remediation Plan.

1.4.3 IH Daily Reports

Prepare a written IH Daily Report for each day that microbial remediation work is being accomplished. Submit the IH Daily Report to the Contracting Officer by 1000 hours of the following day. The IH Daily Report at a minimum must include measurements of differential pressure and temperature and relative humidity in work areas, and detail any non-compliance issues observed.

1.4.4 Submittals at Completion of Remediation Work

Within 14 days of completion, provide the following information:

a. Daily Project Logs.

b. IH Daily Reports.

c. Photographic Logs.

d. Contractor's Industrial Hygienist Report certifying the microbial remediation is complete.

1.5 RECORD KEEPING

A Daily Project Log forms a permanent record of the project. Secure and maintain these logs and any other required documentation as part of the permanent project file.

1.5.1 Daily Project Log

The Microbial Remediation Supervisor must maintain a Daily Project Log, which is used each day of the project to document the following information.

a. Date.

b. Name of Microbial Remediation Supervisor.

c. Name of Industrial Hygienist monitoring work area.

d. Number of workers on site.

e. Equipment utilized.

f. Brief description of daily work activities.

g. Listing of any non-compliance noted, emergencies, stop work orders (with detailed explanation), and descriptions of any other significant events.

PART 2 PRODUCTS

2.1 DISINFECTANTS, BIOCIDES, SANITIZING SOLUTIONS AND FUNGICIDAL AGENTS, (EPA)

EPA Registered chemical agents for the use detailed in the Microbial Remediation Plan and used in accordance with the manufacturer's specifications. Provide SDS sheets to the Contracting Officer for any chemicals that are used during the performance of the work for approval.

2.2 HAZARD COMMUNICATION

Adhere to all parts of 29 CFR 1926.59 and provide the Contracting Officer with a copy of the Safety Data Sheets (SDS) for all materials brought to the site.

PART 3 EXECUTION

3.1 EQUIPMENT

Provide manufacturer's certificate of compliance for all equipment used to contain the microbial contamination.

3.1.1 Respirators

Select respirators from those approved by the National Institute for

Occupational Safety and Health (NIOSH), Department of Health and Human Services. Provide personnel engaged in set-up, pre-cleaning, cleanup, handling, and removal of contaminated materials with the appropriate respiratory protection as specified in 29 CFR 1910.134. Microbial remediation plan must consider Table 17.1 in AIHA IMOM08-679 "Recognition, Evaluation, and Control of Indoor Mold", which lists the minimum levels of respiratory protection based on the activity and size of the remediated area.

3.1.2 Protective Clothing

Provide all workers with protective clothing as appropriate for the work being accomplished, as required by the Microbial Remediation Plan.

3.1.3 Warning Signs and Labels

Provide bilingual warning signs printed in English and Spanish at all approaches to the work areas IICRC S500. Locate signs at such a distance that personnel may read the sign and take the necessary protective steps required before entering the area. Warning signs may be in the form of continuous plastic tape. Provide the warning signs with black characters on a yellow background.

WARNING
DO NOT ENTER
MICROBIAL REMEDIATION WORK IN PROGRESS

Alternate wording for the warning signs will be approved by the Contracting Officer.

3.1.4 Dehumidifiers

Install and use dehumidifiers as needed during the remediation to maintain relative humidity below 60 percent in the work area. Drain the condensate water to a permanent drain, or empty as needed to prevent water overflowing from the dehumidifiers. IHFOM, CH 13, Sec. 3.

3.1.5 Air Filtration Units (AFU)

Install and use AFUs with HEPA filters, and manufacturer specified pre-filters, as part of the exhaust ventilation system to develop and maintain the specified desired air pressure differential inside the enclosed work area relative to the outside areas. Acquire and pay for any licenses needed for use of any equipment, including but not limited to, air pressure differential systems and air filtration systems.

a. Replace HEPA filters and pre-filters for AFUs as required to maintain pressurization performance requirements during demolition and cleaning. Do not reuse filters. Bag used filters at a minimum in clear 6 mil (IHFOM, CH 13, Sec. 3) polyethylene bags within the containment and disposed as contaminated waste.

b. Discharge air from any AFUs located in the work area containment to the outside environment when creating a negative pressure containment to create a negative pressure relative to the outside and adjacent work areas not undergoing active remediation of 0.02 inch H2O to 0.04 inch H20 AIHA IMOM08-679. Discharge air in excess of that required for creating the proper negative pressure to the work area. The AFUs must provide four to six air changes per hour in the work area (

ANSI/IICRC S520). Under no circumstances may air from AFUs discharge to an occupied area. Coordinate location of window sashes or doors required for discharge openings with the Contracting Officer. Exhaust discharge openings may be constructed of plywood, and the seals around such opening must be airtight.

c. Seal all exhaust and intake openings in AFUs with one layer of 6 mil (IHFOM, CH 13, Sec. 3) polyethylene sheeting when not in use.

3.1.6 Vacuum Cleaners Equipped with HEPA Filters

Provide vacuum cleaners equipped with HEPA filters designed for continuous operation in order to complete the work in a timely and efficient manner.

a. Provide nozzle attachments as required to adequately remove all dust. As a minimum, include crevice and extended bristle brush nozzles. Only use a vacuum equipped with a HEPA filter.

b. Provide sufficient vacuum cleaners equipped with HEPA filters designed for continuous operation in the work area during microbial remediation inside the containment area.

c. Provide additional vacuum cleaners equipped with HEPA filters in the enclosed work area during remediation or cleaning work as required by the size (area) of the containment and to maintain timely progress of the work.

3.2 GENERAL REQUIREMENTS

3.2.1 Pre-Microbial Remediation Work Conference

Meet with the Contracting Officer prior to beginning work to discuss in detail the Microbial Remediation Plan, including work procedures and safety precautions. Once approved by the Contracting Officer, the plan will be enforced as if a part of this specification. Any variances to the specification as a result of the plan must be specifically identified to allow for free discussion and approved by the Contracting Officer in writing prior to starting work. Before work in areas with Asbestos Containing Materials (ACM), Presumed Asbestos Containing Materials (PACM) and Lead begins, identify the presence, location, and quantity of ACM, PACM and Lead. Ensure proper notification of regulatory authorities. Consult with Contracting Officer to obtain facility ACM / LBP surveys. Mitigate any disturbance of painted/coated surfaces in accordance with 29 CFR 1926.62, 29 CFR 1926.1126 and 29 CFR 1926.1127.

3.2.2 Containment Entry / Exit Procedure

Ensure that each worker and authorized visitor follows entry and exit procedures detailed in the Microbial Remediation Plan.

3.3 REMOVAL PROCEDURES

3.3.1 Protection of Existing Work Areas

Perform work in a manner to minimize the damage or contamination to areas outside or directly adjacent to the work area. Inspect areas inside and outside proposed work areas to identify existing damage and notify Contracting Officer prior to start of work.

Where materials outside work area are damaged or contaminated as a result of the Contractors work efforts as verified by the Contracting Officer using visual inspection or sample analysis, it must be restored to its original condition or decontaminated by the Contractor at no expense to the Government as deemed appropriate by the Contracting officer. Should adjacent or outside areas become contaminated as a result of the Contractors work efforts, stop work immediately. Clean the newly contaminated areas at no additional expense to the Government. The work may proceed at the discretion of the Contracting Officer once the area has been verified by visual inspection as restored.

3.3.2 Remediation of Fungally Contaminated Building Materials

The removal of contaminated materials must follow in general the listed sequence of work. The Contractor may make changes to improve work flow with the approval of the Contracting Officer.

a. Provide level of containment and PPE required by the Microbial Remediation Plan.

b. Disable all HVAC units and exhaust fans in the area to be remediated. Cover and seal all supply vents, return vents, and air handling units in the project area using two layers of 6 mil poly (IHFOM, CH 13, Sec. 3).

c. Protect materials to remain in work area. Where possible, clean all materials to be salvaged in place to prevent possible cross-contamination created by moving materials through non-remediation areas.

d. Remove undamaged items and materials to be cleaned and salvaged from the work area. Store materials in an area with relative humidity maintained below 60 percent and where temperatures will not damage the material. Notify Contracting Officer of existing damage to items prior to removal.

e. Set up containments, including protection of materials remaining within the containment and AFUs. Notify Contracting Officer that the area is prepared for remediation activities.

f. Pre-demolition inspection by the Contracting Officer.

g. Demolition and removal / cleaning of contaminated materials.

h. Post-remediation inspection by the Contracting Officer.

i. Perform final cleaning in the containment.

j. Clean carpet in the containment if salvageable.

k. Clearance inspection by the Contracting Officer.

l. Duct and HVAC cleaning, if necessary.

m. Deconstruction of containment, removal of AFUs.

n. Return previously items that were removed and cleaned to the occupied area.

3.3.3 Remediation Procedures

3.3.3.1 Remediation of Non-Porous Materials

Method of remediating non-porous items:

a. HEPA vacuum all surfaces.

b. Damp wipe all surfaces using clean water or a detergent solution.

c. Ensure all cleaned surfaces are dried thoroughly.

3.3.3.2 Semi-Porous Materials (Unfinished Wood)

Use this method for remediating unfinished wood-based items, including wood and wood framing in wall cavities:

a. Cleaning

(1) HEPA vacuum all surfaces.

(2) Scrub surfaces with a brush and detergent to remove mold.

(3) Ensure all cleaned surfaces are dried thoroughly.

(4) HEPA vacuum all surfaces to remove dust.

(5) Repair finishes as required to match original.

b. Removal

c. Where unfinished wood product has been structurally damaged, remove and replace with an equivalent product. This includes wall studs and sheathing, such as OSB used in flooring, wall, or roof construction. Lightly mist mold contaminated material before removal.

3.3.3.3 Semi-Porous Materials

Use this method for surface cleaning semi-porous materials such as concrete, vinyl wall covering, linoleum, leather furniture, and finished wood products:

a. HEPA vacuum all surfaces.

b. Damp wipe surfaces using clean water or a detergent solution. Avoid over-wetting the material. Ensure all materials are dried thoroughly

3.3.3.4 Porous Materials

a. Carpet

(1) Removal: Remove carpet that has remained wet for 48-hours or longer (AIHA IMOM08-679). If carpet has dried out, lightly mist before removal.

(2) Cleaning (for carpet that has been wet for less than 48-hours) AIHA IMOM08-679: Use a dry absorbent compound cleaning method as designated by IICRC S100. This method uses an absorbent compound to dissolve, suspend and absorb carpet soils. It does not add

moisture back into the carpet. Ensure carpet is dried thoroughly after cleaning

b. Gypsum Wallboard (GWB)

(1) Removal: Remove Gypsum Wallboard that has remained wet for 48-hours or longer (AIHA IMOM08-679), or has visible mold growth. Where removal of GWB exposes insulation, remove the insulation. Lightly mist all contaminated materials before removal.

(2) Surface Cleaning: Where GWB has a small amount of surface mold growth and the GWB is structurally sound, a surface cleaning method may be used with the permission of the Contracting Officer. HEPA vacuum all surfaces and wipe down with a detergent solution. Do not use surface cleaning where mold growth penetrates wallboard substrate. Thoroughly dry the cleaned areas and paint to lock down any residual spores.

c. Ceiling Tile

(1) Removal: Remove ceiling tile that has remained wet for 48-hours or longer, or has visible mold growth (AIHA IMOM08-679). If ceiling tile has dried out lightly mist before removal.

d. Paper/Electronic Media and Sensitive Equipment

e. Classified and Controlled Unclassified Information whether it is paper, electronic media or equipment must be properly safeguarded / secured until it is properly destroyed in accordance with SECNAV M-5510.36 and it cannot be discarded without utilizing the proper destruction methods. Contractor personnel cannot be granted access to classified information or Controlled Unclassified Information until they have met the security requirements stated in the paragraph SECURITY REQUIREMENTS.

(1) Removal: Only papers or documents that are unclassified and do not contain controlled unclassified information can be discarded in the trash. Classified and Controlled Unclassified information must be destroyed by appropriately cleared military, government or contractor personnel using an approved DOD destruction method for that specific level of information. Discard paper materials that have remained wet for 48-hours or longer, or that have visible mold growth. Paper materials that have been wet for less than 48-hours may be allowed to dry if approved by the Contracting Officer.

(2) Containment: Where paper materials, such as personnel records must be retained, the following containment methods may be used with the permission of the Contracting Officer. The method of containment for paper products is as follows:

(a) Thoroughly dry the paper material. Safeguard Classified and Controlled Unclassified Information at all times in a GSA approved security container, restricted area, vault, or under the direct physical control of appropriately cleared personnel.

(b) Where routine access to the material is required, a copy

must be made. Contractor personnel must not reproduce copies of classified information or controlled unclassified information without the prior written approval of the Contracting Officer and the Government Agency Security department with responsibility for the work area. If approval is obtained, only appropriately cleared Contractor personnel are authorized to reproduce the information and they must use only DOD authorized reproduction equipment.

(c) When not in use, secure the classified and controlled unclassified information in an approved GSA security container, restricted area, or vault. Limit access to the container to only appropriately cleared personnel. Implement an access procedure involving opening the container in a secure area with provision for capturing mold spores and respiratory protection for workers opening the container for these materials. Store the container in an area where the relative humidity is maintained below 60 percent to prevent further mold growth.

f. Textiles

(1) Discard textiles with visible mold growth.

(2) Clean textile based items, including clothing, linens, and toys that do not have visible mold growth, but have been wet, in standard commercial or residential washing machines with standard washing machine detergent.

(3) Dry all items completely before returning to the building / house.

(a) When possible, use dryers to dry items.

(b) If dryers will cause irreversible harm to the item, hang the item on a drying rack in a temperature and humidity controlled space. Discard items not dry within 48-hours (AIHA IMOM08-679).

g. Upholstered Furniture

(1) Removal: Discard upholstered furniture that has remained wet for 48-hours or longer (AIHA IMOM08-679), or that have visible mold growth.

(2) Cleaning: Clean upholstered furniture that has been exposed to mold spores but does not have visible mold growth by HEPA vacuuming upholstery and wood or metal structure, followed by a damp wipe of semi-porous or non-porous portions of the furniture. Dry furniture thoroughly after cleaning.

3.4 DETAILED SEQUENCE OF WORK FOR MOLD REMOVAL UNDER CONTAINMENT

3.4.1 Preparation for Remediation Work

a. Provide level of containment and PPE required for the remediation based on the Microbial Remediation Plan.

b. Disable all HVAC units and exhaust fans in the area to be remediated.

c. Remove undamaged materials from the work area if they are to be salvaged but cannot be cleaned in place. Store materials in an area with relative humidity maintained below 60 percent (IHFOM, CH 13, Sec. 3) and where temperatures will not damage the material. Notify Contracting Officer of existing damage to items prior to removal. Clean materials using procedures detailed in Remediation Procedures.

d. Remove supply diffusers, return grilles and exhaust grilles. Clean diffusers and grilles using procedures detailed in Remediation Procedures.

e. Construct containment barriers. Existing walls can be used as a portion of the containment barriers if existing openings in walls (such as doors, wall openings, vents) are sealed using 6 mil polyethylene.

f. Install the AFUs and dehumidifiers.

g. Seal supply, return, and exhaust openings with 6 mil polyethylene sheeting and protect intakes to air handling units. Air handling units are to remain off.

h. Install all equipment needed for removal work in the containment area to minimize egress during demolition.

i. The Contracting Officer will inspect the containment to verify that the containment is properly constructed and the containment area has an overall negative pressure of 0.02 to 0.04 inch water column AIHA IMOM08-679 relative to the outside and adjacent work areas not undergoing active remediation, prior to beginning demolition work.

3.4.2 Demolition

a. Remove mold contaminated materials to be discarded, such as paper, and furniture. Double bag material in 6 mil (IHFOM, CH 13, Sec. 3) poly bags. Seal poly bags using duct tape inside the containment. HEPA vacuum bags before removing them from the containment or airlock. When possible, pass the bags directly from the containment or airlock to the outside. Transport bags to a dumpster. Do not leave the bags at the building / house.

b. Lightly mist all contaminated materials that are being discarded to minimize generation of airborne mold spores during demolition/removal.

c. Remove contaminated gypsum wallboard (GWB) at the preliminary limits of demolition specified in the Microbial Remediation Plan. Inspect back side of removed GWB. If mold is observed on the back side of the GWB, report this condition to the Contracting Officer. After obtaining Contracting Officer approval, continue removing GWB until no mold is observed. If hidden mold is discovered that will extend past the extents of the containment, stop work immediately and reconstruct the containment to extend past the suspected contamination. Re-evaluate level of containment and PPE. Continue to operate AFUs during reconfiguring of containment.

d. Remove drywall by cutting in pieces as large as possible to minimize aerosolization of fungal spores. Drywall screws can either be backed out during removal or later during cleanup.

e. Use dust collection attachments on all power tools, such as sanders, saws, to capture dust created when using the tools. Outlet of dust collector should discharge into inlet of AFU.

f. Remove fiberglass insulation behind removed gypsum board.

g. If wood studs are contaminated, HEPA vacuum all surfaces, scrub them with a brush and detergent to remove mold. After scrubbing studs, HEPA vacuum again to remove any remaining dust. Replace wood studs with damage severe enough to reduce the structural capacity of the member. Prior to removal of any structural member consult with the Contracting Officer.

h. Clean all metal framing with a dilute detergent solution. Clean metal framing with light rust using steel wool and coat with a rust inhibiting paint. Replace metal framing with rust damage severe enough to reduce the structural capacity of the member. Prior to removal of any structural material, consult with the Contracting Officer.

i. Remove contaminated carpet scheduled for removal.

j. Place removed gypsum board, insulation, carpet and remaining debris in two layers of 6 mil (IHFOM, CH 13, Sec. 3) poly bags. Seal poly bags using duct tape inside the containment. HEPA vacuum bags before removing them from the containment or airlock. When possible pass the bags directly from the containment or airlock to the outside. Transport bags to a dumpster. Do not leave the bags at the building / house.

k. Remediation workers must HEPA vacuum their PPE, then remove their PPE within the airlock chamber. Discard disposable coverall suits into a 6 mil (IHFOM, CH 13, Sec. 3) poly bag.

3.4.3 Post-Demolition Inspection

a. The Contracting Officer will inspect the containment area to verify that all contaminated materials have been removed.

b. Allow a minimum of 12-hours after completion of removal work, with AFUs operating, for airborne dust in the containment to settle or be removed by the AFUs.

3.4.4 Cleaning after Demolition, and Cleaning of Settled Spores from Porous / Non-Porous Materials

a. Continue to operate AFUs during cleaning.

b. Clean exposed surfaces.

(1) HEPA vacuum all surfaces.

(2) Damp wipe all non-porous exposed surfaces including polyethylene sheets used to protect materials, external surfaces of ductwork, studs, and floors with clean rag and clean potable water or detergent solution.

(3) Remove poly sheeting inside the containment.

(4) HEPA vacuum all surfaces protected by poly sheeting.

(5) Damp wipe non-porous surfaces protected by poly sheeting with clean water or a detergent solution.

(6) Clean carpet using procedures previously specified in paragraph POROUS MATERIALS above.

c. Final clearance inspection will be conducted by Contracting Officer. Clearance inspections will be performed using the procedures detailed in Post-Remediation Inspection. If areas fail final clearance inspections, additional corrective actions taken by the contractor must be at no additional cost to the Government. Maintain containments in place until spaces are inspected and accepted by the Government as being fully remediated. The Government will determine whether additional cleaning is required by the Contractor and whether the clearance process must be repeated.

3.5 DUCT AND HVAC SYSTEM CLEANING

3.5.1 Contractor Qualifications

a. The HVAC cleaning contractor must be a certified member of NADCA.

b. The HVAC cleaning contractor must have at least one individual with Ventilation System Mold Remediator Qualifications certified by NADCA onsite during duct and HVAC system cleaning.

3.5.2 Inspection

IH must visually inspect the HVAC system serving all work areas (or as required in the initial Microbial Assessment Survey performed by the Government), and determine if additional remediation is needed to clean the HVAC system, thus preventing re-contamination. Coordinate inspection with the contracting officer. Notify the Contracting Officer of the inspection results. The Contractor must receive written approval from the Contracting Officer before proceeding with HVAC microbial remediation.

3.5.3 HVAC Microbial Remediation

Conduct the following actions if authorized by the Contracting Officer.

a. Follow requirements of the NADCA ACR "Standard for Assessment, Cleaning, and Restoration of HVAC Systems" and/or NAMRI APR guidelines.

b. Using a "gassing" or "fogging" method of cleaning with gaseous chlorine dioxide or ozone is not allowed.

c. Disable all HVAC equipment prior to cleaning any component of the system.

d. Use this method for cleaning the air handling units, terminal units, blowers and exhaust fans:

(1) Construct a limited containment around equipment to be cleaned. Provide appropriate PPE for workers.

(2) Remove filters. Seal filters in 6 mil (IHFOM, CH 13, Sec. 3)

poly bags for disposal.

(3) Disassemble units as necessary to clean components. Contractor is responsible for correctly reassembling equipment after cleaning.

(4) Clean disassembled components within the containment or in a separate two chamber cleaning containment. Seal disassembled components in 6 mil (IHFOM, CH 13, Sec. 3) poly bags for transport out of building / house. HEPA vacuum bags before removing them from the containment or airlock.

(5) HEPA vacuum all surfaces.

(6) Damp wipe all non-porous surfaces and components with clean water or a detergent solution.

e. Use this method for cleaning HVAC coils:

(1) Clean coils using a method that renders the coil visibly clean. Coil cleaners must be non-acidic / alkaline, detergent based. Clean condensate drain pans. The drain for the condensate drain pan must be operational during the cleaning.

(2) Rinse coils and drain pans with clean water to remove any latent residues.

(3) Cleaning methods must not cause damage to the coil surface or fins.

(4) Cleaning must restore the coil pressure drop to within 10 percent of the pressure drop measured when the coil was first installed. If the original pressure drop is not known, the coil is considered clean only if the coil is free of foreign matter and chemical residue.

f. Use this method for cleaning the duct system:

(1) During cleaning, connect a vacuum collection system to the downstream end of the section being cleaned. The vacuum collection device must be of sufficient power to render all areas of duct being cleaned under negative pressure relative to rooms and areas of duct not being cleaned. Verify negative pressure at the furthest point from the collection system with a micromanometer and include verification measurements in the IH Daily Report.

(2) Equip the vacuum collection systems with HEPA filters. Exhaust the vacuum collection systems directly to the outside.

(3) Use mechanical agitation devices to dislodge debris adhered to the ductwork, such that debris may be safely conveyed to vacuum collection devices. Cleaning methods must not damage the integrity of the ductwork, nor damage porous surface materials such as liners inside the ductwork.

(4) HEPA vacuum duct surfaces.

(5) When possible, damp wipe metal duct surfaces with clean water or

detergent solution. Do not wet fibrous glass thermal or acoustical insulation.

(6) Identify areas where there is evidence of damage to or uncleanable mold in duct insulation. The Contracting Officer will make the decision to discard the insulation, if necessary.

g. Final clearance of HVAC and duct system will be based on a visual assessment (no visible dust, no visible mold) by Contracting Officer. If HVAC fails final clearance inspection, additional corrective actions taken by the contractor must be at no additional cost to the Government.

3.6 FIRE PROTECTION

Provide portable fire extinguishers within the containment area and outside the decontamination unit. Fire extinguishers must be rated for the class of fire hazards in the work area and sized for coverage of the areas within the containment. At a minimum, one 10 pound ABC fire extinguisher for every 1,000 square feet must be strategically placed around the containment. Personnel must be trained for emergency egress and the use of fire extinguishers. Notify fire officials of work activities as required. IICRC S500

3.7 CONSTRUCTION BARRIERS

a. Provide interior shoring, bracing, or support to prevent movement, settlement, or collapse of structure, element, adjacent facilities, or work to remain. Shoring, bracing or support necessary for structural wood studs or metal framing must be removed and replaced when they cannot be cleaned.

b. Do not disturb microbial-contaminated building materials while isolating work areas. This precaution prevents the release of microbial spores.

c. Workers must wear respirators and other PPE as outlined in the microbial remediation plan when installing critical barriers where microbial contaminated surfaces (walls or surfaces with visible settled dusts) are likely to be disturbed. Operate an AFU if disturbance is likely during setup.

d. Monitor the air pressure differential across work area containments. The monitoring system must be in place before the start of remedial activities. Verification by the Industrial Hygienist is required prior to the start of the microbial remediation.

3.8 QUALITY ASSURANCE / QUALITY CONTROL REQUIREMENTS

3.8.1 Contractor Qualifications

Work must be performed by a qualified remediation contractor. Contractor must carry insurance that specifically covers mold remediation.

a. Remediation contractor's on-site supervisor must have one of the following certifications: Certified Microbial Remediator (CMR), Certified Microbial Remediation Supervisor (CMRS), or Applied Microbial Remediation Specialist (AMRS). Qualified supervisor must be onsite whenever active remediation is being performed. Set-up

activities may be performed without supervisor present; qualified supervisor must review set-up prior to start of work.

b. Mold remediation workers must be given training in PPE and mold remediation activities as required for their particular job. Microbial remediation plan must provide details of worker training.

3.8.2 Waste Management and Removal

Keep the site and work area free from accumulations of dust, waste materials, or rubbish caused by Contractor operations and free from any flammable materials or other sources of fire hazard. Remove all waste materials and rubbish from and about the work site in strict accordance with the specifications and applicable codes and regulations.

3.8.3 Post-Remediation Inspection

Clean up all debris and dust in interior spaces outside the work area resulting from the Contractor's remediation work.

After all visible accumulations of material and debris are removed from the containment, provide the Contracting Officer a 24-hour notice for a final clearance visual inspection. The Contracting Officer and Contractor's Industrial Hygienist must conduct a thorough visual inspection of the work area. If during this inspection any visible debris or microbial contamination are observed, the Contractor must re-clean the work area without additional cost to the Government.

3.8.3.1 Clearance

a. Clearance Criteria

b. Clearance will be based on visual assessment (all visible mold removed, all visible dust removed, based on a "white glove" test) by the Contracting Officer. "White glove" test consists of wiping the surface with a clean cloth of color suitable to reveal expected type of dust. For most surfaces, a white cloth is suitable. For GWB dust, a dark cloth may be more appropriate.

c. Failed remediation areas must be recleaned at no additional cost to the Government and the AFUs kept in operation another 12-hours, followed by another visual assessment. Subsequent failures must follow the same routine until a pass condition is secured.

3.9 CLEAN-UP AND DISPOSAL

3.9.1 Disposal of Material

Dispose of contaminated bagged waste materials removed during this remediation as general construction debris. Follow all applicable local, State, and Federal requirements for the disposal of this material.

3.9.2 Material Packaging

Place waste, as waste is removed, into a disposal container promptly. Disposal containers must consist of at a minimum, two layers of clear 6 mil (IHFOM, CH 13, Sec. 3) polyethylene bags. Tape bags in a gooseneck fashion to form an airtight seal and label appropriately. Bag waste from vacuums equipped with HEPA filters in 6 mil (IHFOM, CH 13, Sec. 3)

polyethylene bags.

3.9.3 Building Exit (Waste Disposal)

HEPA vacuum and damp wipe bags of contaminated waste material prior to removal from the building. When possible pass the bags directly from the containment or airlock to the outside. Transport bags to a dumpster.

3.9.4 Hazardous Material

Should the Contractor encounter any hazardous materials, notify the Contracting Officer immediately for direction.

Separate hazardous waste from non-hazardous waste to be recycled or reclaimed to the greatest extent practicable and exclude hazardous waste from waste reduction calculations in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

3.10 APPENDICES

Appendix A - Microbial Assessment Visual Field Report Form

Appendix A

Microbial Assessment Visual Field Report Form

TO DOWNLOAD THIS FORM, SEE UFGS FORMS, GRAPHICS AND TABLES
Go to https://www.wbdg.org/dod/ufgs/forms-graphics-tables

-- End of Section --

SECTION 25 05 11

CYBERSECURITY FOR FACILITY-RELATED CONTROL SYSTEMS
08/24

PART 1 GENERAL

Many subparts in this Section contain text in curly braces ("{" and "}") indicating which cybersecurity control and control correlation identifier (CCI) the requirements of the subpart relate to. The text inside these curly braces is for Government reference only and enables coordination of the requirements of this Section with the RMF process throughout the design and construction process. Text in curly braces are not contractor requirements.

This Section refers to Security Requirements Guide (SRGs) and Security Technical Implementation Guide (STIGs). STIGs and SRGs are available online at the Information Assurance Support Environment (IASE) website at https://public.cyber.mil/stigs/downloads/ and an SRG/STIG Applicability Guide and Collection Tool is available at https://public.cyber.mil/stigs/SCAP/. Not all control system components have applicable STIGs or SRGs. The "Control Systems SRG" does not apply to work performed under this Section; all requirements within this section to apply applicable SRGs DO NOT include the "Control Systems SRG".

1.1 RELATED REQUIREMENTS

This section does not contain sufficient requirements to procure a control system and must be used in conjunction with other Sections which specify control systems. This Section adds cybersecurity requirements to the control systems specified in other Sections, and as these requirements are conditioned on the control system being provided, there may be requirements in this Section that will not apply to this project. All Sections containing facility-related control systems or control system components are related to the requirements of this Section. Review all specification sections to determine related requirements.

In cases where a requirement is specified in both this Section and in another Section, the more stringent requirement must be met. In cases where a requirement in this Section conflicts with the requirements of another Section such that both requirements cannot be met at the same time, request direction from the Contracting Officer to determine which requirement applies to the project.

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.

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 802.1x	(2010) Local and Metropolitan Area Networks - Port Based Network Access Control

INTERNET ENGINEERING TASK FORCE (IETF)

IETF RFC 2819	(2000) Remote Network Monitoring (RMON) Management Information Base (MIB)

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST FIPS 140-2	(2001) Security Requirements for Cryptographic Modules
NIST FIPS 201-2	(2013) Personal Identity Verification (PIV) of Federal Employees and Contractors

U.S. DEPARTMENT OF DEFENSE (DOD)

DODI 8551.01	(2014) Ports, Protocols, and Services Management (PPSM)
DTM 08-060	(2008) Policy on Use of Department of Defense (DoD) Information Systems - Standard Consent Banner and User Agreement

1.3 DEFINITIONS

1.3.1 Administrator Account

An administrator account is an account with full permissions to a device, application, or operating system, including the ability to create and modify other user accounts.

Note that the operating system Administrator Account may be different than Administrator Accounts for applications hosted on that operating system. Also, most controllers will not have any support for accounts and will therefore not have an 'Administrator Account'.

1.3.2 Computer

A computer is one of the following:

a. a device running a non-embedded desktop or server version of Microsoft Windows

b. a device running a non-embedded version of MacOS

c. a device running a non-embedded version of Linux

d. a device running a version or derivative of the Android Operating System, where Android is considered separate from Linux

e. a device running a version of Apple iOS

Unless otherwise indicated or clear from context use of the word "device" in this Section includes computers.

1.3.3 Controller

A device other than a computer or Ethernet switch. For Fire Protection systems this includes fire alarm control panels, remote operating consoles, and remote annunciators.

1.3.4 Mission Space

Mission space is shown on the drawings.

1.3.5 Network

A network is a group of two or more devices that can communicate using a network protocol. Network protocols must provide a method for addressing devices on the network; a communication method that does not provide an addressing scheme is not a networked form of communication. Devices that communicate using a method of communication that does not support device addressing are not using a network. Addresses may be other than IP addresses, and addressing may be at either Open Systems Interconnection (OSI) layer 2 or layer 3.

1.3.6 Network Connected

A component is network connected (or "connected to a network") only when the device has a network transceiver which is directly connected to the network and implements the network protocol. A device lacking a network transceiver (and accompanying protocol implementation) can never be considered network connected. Note that (unlike many IT definitions of "Network Connected") a device connected to a non-IP network is still considered network connected (an IP connection or IP address is not required for a device to be network connected).

1.3.6.1 Wireless Network Connected

Any device that supports wireless network communication is network connected to a wireless network, regardless of whether the device is communicating using wireless. Unless physically disabled, devices with wireless transceivers support wireless, it is not sufficient to disable the wireless in software.

1.3.7 Network Media

The thing that provides the communication channel between the devices on a network. Typically wire, but might include wireless, fiber optic, or even power line (some network protocols allow sending network signals over power wiring).

1.3.8 User Account Support Levels

The support for user accounts is categorized in this Section as one of three levels:

1.3.8.1 FULLY Supported

Device supports configurable individual accounts. Accounts can be created, deleted, modified, etc. Privileges can be assigned to accounts. These devices support user-based (as opposed to role-based) authentication.

1.3.8.2 MINIMALLY Supported

Device supports a small, fixed number of accounts (perhaps only one). Accounts cannot be modified. A device with only a "User" and an "Administrator" account would fit this category. Similarly, a device with two PINs for logon - one for restricted and one for unrestricted rights

would fit here (in other words, the accounts do not have to be the traditional "username and password" structure). These devices typically only support role-based authentication.

Examples of devices which MINIMALLY support accounts are a) a variable frequency drive with a single account which requires a PIN for access to configuration; and b) a room lighting control touchpad interface that has a single account.

1.3.8.3 NOT Supported

Device does not support any Access Enforcement therefore the whole concept of "account" is meaningless.

1.3.9 Manual Local Input

Manual Local Inputs are system analog or binary inputs that are adjustable by a person but are, by intrinsic hardware design, very limited in potential capabilities. Manual Local Inputs do not have touch screens or full keyboards, but may have a few buttons or dials to allow input. Manual Local Inputs do not have full graphic screens or dot-matrix displays, but may have simple lights (LEDs) or 7-segment displays. Manual Local Inputs do not have any sort of menu structure, each button has a single well-defined function.

Examples of Manual Local Inputs are H-O-A switches, simple thermostats, and disconnect switches.

1.3.10 Card Reader

A card reader is an input/output device whose primary function is to assist in two-factor authentication. A card reader must have an interface to read data from a card and may be able to write data to a card. A card reader may have a means (such as buttons, keypad, touchscreen, etc.) for a user to input a PIN or password, as well as a limited display.

1.3.11 User Interface

A User Interface (UI) is something other than a Manual Local Input or Card Reader that allows a person to interact with the system or device. Note that while a Card Reader is not by itself a User Interface, a User Interface may contain a Card Reader in order for it to authenticate its user. Within control systems, there are a wide range of User Interfaces.

Two important distinctions are 1) whether the user interface is Local or Remote, and 2) the effective capabilities of the User Interface to alter data, which is the "privilege" of the user interface (where effective privilege available to a specific user at a specific user interface is the combination of the greatest privilege offered by the user interface and the specific account the user is logged into).

1.3.11.1 Local User Interface

A Local User Interface is a user interface where the physical hardware the user interacts with (keyboard, buttons, display, etc.) is physically part of the device being affected. All of the relevant characteristics of the user interface are embodied within a single device.

Note that a Local UI may be able to access data in a different device,

Local versus Remote in this context refers to the user interface itself; the capability to access data in a different device is covered under "Full User Interface".

1.3.11.2 Remote User Interface

A Remote User Interface implements a Client/Server model where the physical hardware the user interacts with (Client) is physically distinct from the device being affected (Server). Most or all of the security and functionality characteristics of the user interface are defined by the Server, not the Client. The Client and Server communicate via a network connection. A common example of a remote user interface is a web-based interface where the browser (client) is generally on different hardware than the web server (server). A Remote UI remains a Remote UI even if the user happens to be at a Client on the same hardware as the Server. What is important is that a) the Client may be on different hardware than the Server and b) the majority of the security and functional characteristics of the interface are defined at the Server.

Note that this definition of "remote" is consistent with that generally used in the control industry but is not aligned with the NIST 800-53 definition of "Remote", which refers to "outside the system". The term "Remote" here better aligns with the NIST 800-53 definition of "Network" (remote from within the system) Access.

1.3.11.3 Types of User Interface (by capability)

User interfaces are also categorized by their capabilities as being Read Only, Limited, or Full.

1.3.11.3.1 Read-Only User Interface

A Read Only User Interface (also referred to as a View-Only User Interface) is a user interface that only allows for reading data, it does not allow (have the capability to) modify data. A Read Only User Interface may be either Local or Remote. A User Interface that is configured to be Read Only (by some other means than the interface itself, such as using configuration software on a laptop) is a Read-Only Interface. Note a Read Only User Interface may have buttons (or touch screen, etc.) allowing the user to navigate through the presentation of data.

Examples of a Read Only User Interfaces are a) a publicly viewable "energy dashboard" showing weather data and energy usage within a building and b) digital wayfinding signage.

1.3.11.3.2 Limited User Interface

A Limited User Interface is a user interface that - by design - can only alter information local to the user interface. Note that the determination of "alter" includes only direct interactions, it explicitly excludes interactions that might occur as secondary effects. For example, an interface changing the flow setpoint in a pump controller is a direct interaction, the subsequent change in flow (as well as any subsequent downstream changes in valve position) are not direct interactions.

Two examples of LIMITED UIs are: a) a variable speed drive has a Limited Local User Interface which allows the user to change properties within the drive, but does not allow affecting things outside the drive; and b) a

typical home WiFi Router has a Limited Remote User Interface which allows configuration of the Router, but does not allow direct interaction with other devices.

1.3.11.3.3 Full User Interface

A Full User Interface can alter information in devices outside the device with the user interface. For example, a typical Local Display Panel is a Full Local User Interface while a browser-based front end is a Full Remote User Interface.

1.3.11.3.4 View-Only User Interface

See Read-Only User Interface

1.3.11.4 Other User Interface Terminology

In addition to defining whether a user interface is a Hardware Limited, Read-Only, Limited or Full, and whether it is Local or Remote, user interfaces are classified by whether they are writable or privileged.

1.3.11.4.1 Writable User Interface

Any User Interface that is not Read-Only is Writable. (Limited User Interfaces and Full User Interfaces are both writable user interfaces (as they are capable of changing a value)).

1.3.11.4.2 Privileged User Interface

A Privileged UI is a UI that has sufficient capabilities or functionality that it requires specific cybersecurity measures to be put in place to limit its unauthorized use. Ultimately, whether a specific user interface is considered a Privileged User Interface must be determined by usage. Unless otherwise specified, user interfaces can be determined to be privileged or not using the following:

a. Read-Only User Interfaces are not privileged user interfaces.

b. User Interfaces that can inhibit or force the activation of a fire suppression system (e.g. such as for a pre-action or deluge system) are always privileged user interfaces. Other Full User interfaces for Fire Alarm Systems are privileged user interfaces as indicated and shown, or when another requirement of this Section establishes they are privileged. For all other systems, Full User Interfaces are privileged user interfaces.

c. User interfaces that allow for configuration of auditing or allows for modification or deletion of audit logs are privileged user interface.

d. User interfaces that allow for reprogramming a network connected device is a privileged user interface.

e. Writeable User Interfaces in Electronic Security Systems (ESS) are privileged user interfaces.

f. Except as specified above, a Limited User Interface must be determined to be privileged or not based on the specific capabilities and use case of the user interface. In general however, user interfaces that do not offer significant capabilities above and beyond those available

at that location via other means (e.g. such as a disconnect switch, breaker, or hand-off-auto switch, or physical attack) are not privileged.

1.3.12 Wireless Network

Any network that communicates without using wires or fiber optics as the communication media. Wireless networks include: WiFi, Bluetooth, ZigBee, cellular, satellite, long and short wave radio, 2.4 GHz, free space optical, point-to-point laser, microwave, and IR.

1.3.13 Wired Broadcast Network

Wired Broadcast Networks are any network, such as powerline carrier networks and modem (wired telephony), that use wire-based technologies where there is not a clearly defined boundary for signal propagation.

1.4 ADMINISTRATIVE REQUIREMENTS

1.4.1 Points of Contact

Coordinate with the following Points of Contact as indicated in this Section and as required. Not all projects will require coordination with all Points of Contact. When coordination is required and no Point of Contact is indicated, coordinate with the Contracting Officer (KO).

a. Government Computer Access Point of Contact: Contracting Office (KO)

b. HTTPS Certificate Point of Contact: Contracting Officer (KO)

c. Email Address Point of Contact: Contracting Officer (KO)

d. Password Point of Contact: Contracting Officer (KO)

e. Mobile Code Point of Contact: Contracting Officer (KO)

1.4.2 Coordination

Coordinate the execution of this Section with the execution of all other Sections related to control systems as indicated in the paragraph RELATED REQUIREMENTS. Items that must be considered when coordinating project efforts include but are not limited to:

a. If requesting permission for wireless or wired broadcast communication, the Wireless and Wired Broadcast Communication Request submittal must be approved prior to control system device selection and installation.

b. If requesting permission for alternate account lock permissions, the Device Account Lock Exception Request must be approved prior to control system device selection and installation.

c. If requesting permission for the use of a device with multiple physical connections to IP networks, the Multiple IP Connection Device Request must be approved prior to control system device selection and installation.

d. Wireless testing may be required as part of the control system testing. See requirements for the Wireless Communication Test Report

submittal.

e. If the Device Audit Record Upload Software is to be installed on a computer not being provided as part of the control system, coordination is required to identify the computer on which to install the software.

f. The Cybersecurity Interconnection Schedule must be coordinated with other work that will be interconnected to, and interconnections must be approved by the Government before relying on them for system functionality.

g. Cybersecurity testing support must be coordinated across control systems and with the Government cybersecurity testing schedule.

h. Passwords must be coordinated with the indicated contact for the project site.

i. If applicable, HTTPS web server certificates must be obtained from the indicated HTTPS Certificate Point of Contact.

j. Contractor Computer Cybersecurity Compliance Statements must be provided for each contractor using contractor owned computers.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Wireless and Wired Broadcast Communication Request; G

Device Account Lock Exception Request; G

Multiple Ethernet Connection Device Request; G

Contractor Computer Cybersecurity Compliance Statements; G

Contractor Temporary Network Cybersecurity Compliance Statements; G

Cybersecurity Interconnection Schedule; G

Protection of Information At Rest Proposal; G

Proposed STIG and SRG Applicability Report; G

Pre-Construction Control System Inventory Report; G

SD-02 Shop Drawings

Network Communication, Ports, Protocols and Services Report; G

Cybersecurity Network (Riser) Diagram; G

SD-03 Product Data

Control System Cybersecurity Documentation; G

SD-06 Test Reports

Wireless Communication Test Report; G

Control System Cybersecurity Testing Procedures; G

Control System Cybersecurity Testing Report; G

SD-07 Certificates

Software Licenses; G

SD-11 Closeout Submittals

Confidential Password Report; G

Enclosure Keys; G

Software and Configuration Backups; G

System Maintenance Tool Software; G

Control System Scanning Tools; G

STIG, SRG and Vendor Guide Compliance Result Report; G

Final Control System Inventory Report; G

Integrity Verification Software; G

1.6 QUALITY CONTROL

1.7 CYBERSECURITY DOCUMENTATION

{For Government Reference Only: This subpart (and its subparts) relates to PL-7; CCI-003071}

1.7.1 Proposed STIG and SRG Applicability Report

For each model of network connected or network infrastructure device, use the DISA SRG/STIG Applicability Guide and Collection Tool (available at https://public.cyber.mil/stigs/SCAP/to identify applicable STIGs or SRGs and provide a report indicating applicable STIGs and SRGs for each model. Provide the Proposed STIG and SRG Applicability Report concurrently with the Pre-Construction Control System Inventory Report.

1.7.2 Cybersecurity Interconnection Schedule

{For Government Reference Only: This subpart relates to CA-3(b), PL-8, SC-7(9), SC-7(11); CCI-000258, CCI-003072, CCI-003073, CCI-003075, CCI-002398, CCI-002399, CCI-002401, CCI-002402, CCI-002403. For MODERATE Impact systems, this subpart also relates to SC-7; CCI-001126, CCI-001109}

Provide a completed Cybersecurity Interconnection Schedule documenting network connections between the installed system and other systems. Provide the following information for each device directly communicating

between systems: Device Identifier, Device Manufacturer, Device Description, Transport layer Protocol, Network Address, Port (if applicable), MAC (Layer 2) address (if applicable), Media, Application Protocol, Service (if applicable), Descriptive Purpose of communication. For communication with other authorized systems also provide the Foreign Destination and POC for Destination. For MODERATE Impact Systems: Also describe the impact of loss of the connection on the control system. If other control system Sections used on this project include submittals documenting this information, provide copies of those submittals to meet this requirement.

In addition to the requirements of Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES, provide the Cybersecurity Interconnection Schedule as an editable Microsoft Excel file (a template Cybersecurity Interconnection Schedule in Excel format is available at https://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/ufgs-25-05-11.)

1.7.3 Network Communication, Ports, Protocols and Services Report

{For Government Reference Only: This subpart (and its subparts) relates to CA-9, PL-8; CCI-002102, CCI-002103, CCI-002104, CCI-002105, CCI-003072, CCI-003073, CCI-003075 and also the submittal requirements associated with CM-6, CM-7, including CM-7(3), CCI-000388.}

Provide a Network Communication, Ports, Protocols and Services Report. For each networked device, document device identifier and the communication characteristics of the device including communication protocols, services used, encryption employed, and a general description of what information is communicated over the network. For each device using IP communication, document all TCP and UDP ports used. For each device using non-IP communication, document communication protocol and media used. If other control system Sections used on this project include submittals documenting this information, provide copies of those submittals to meet this requirement.

In addition to the requirements of Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES, provide the Network Communication, Ports, Protocols and Services Report as an editable Microsoft Excel file.

1.7.4 Control System Inventory Reports

{For Government Reference Only: This subpart (and its subparts) relates to CM-8(a), SI-17, IA-3; CCI-000389, CCI-000392, CCI-000398, CCI-002773, CCI-002774, CCI-002775, CCI-000777, CCI-000778, CCI-001958}

Provide a Pre-Construction Control System Inventory Report report and a Final Control System Inventory Report, using the Inventory Spreadsheet listed under this Section at https://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/ufgs-25-05-11. In the Control System Inventory Reports, document all networked devices, including network infrastructure devices. For each device provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet.

In addition to the requirements of Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES, provide the Control System Inventory Reports as editable Microsoft Excel files. Provide the Pre-Construction Control System Inventory Report concurrently with the Proposed STIG and SRG

Applicability Report

1.7.5 Software and Configuration Backups

{For Government Reference Only: This subpart (and its subparts) relates to CP-10; CCI-000550, CCI-000551, CCI-000552}

For each computer on which software is installed under this project, provide a recovery image of the final as-built computer . This image must allow for bare-metal restore such that restoration of the image is sufficient to restore system operation to the imaged state without the need for re-installation of software. If additional user permissions are required to meet this requirement, coordinate the creation of the image with the identified Government Computer Access Point of Contact.

For all Ethernet switches provide a backup of the switch configuration. For all controllers, provide a backup of the controller configuration and the source code for all loaded application programs (all software that is not common to every controller of the same manufacturer and model).

If any or all of these are provided under another Section, provide documentation indicating this and referencing those submittals.

1.7.6 Cybersecurity Network (Riser) Diagram

{For Government Reference Only: This subpart (and its subparts) relates to PL-2(a), PL-8; CCI-003051, CCI-003053, CCI-003072, CCI-003073, CCI-003075}

Provide a cybersecurity network (riser) diagram of the complete control system including all network and device hardware. For each device, include the device identifier, device type, and manufacturer. If the control system specifications require a riser diagram submittal, provide a copy of that submittal as the cybersecurity riser diagram. Otherwise, provide a riser diagram in one-line format overlayed on a facility schematic.

1.7.7 STIG, SRG and Vendor Guide Compliance Result Report

For every component (device or software) with an applicable STIG or SRG in the Proposed STIG and SRG Applicability Report, document compliance with the STIG or SRG requirements.

a. For components which are scannable by the Evaluate-STIG tool (available online at _(CAC Required)_, include the Evaluate-STIG report and raw scan results in addition to the final, manually reviewed and revised, documentation of compliance with STIG and SRG requirements. Checklist files should not contain any findings with a Not Reviewed (NR) status after manual reviews.

b. For components which do not support automated scanning, a manual review using the General Purpose STIG option should be done. A completed Checklist file should not contain any findings with a Not Reviewed (NR) status after manual reviews

For every component (device or software) with manufacturer provided cybersecurity documentation, procedure, or method for secure configuration

or installation, provide a report documenting how the component was configured and any deviation from the manufacturer instructions.

1.7.8 Control System Cybersecurity Documentation

{For Government Reference Only: This subpart (and its subparts) relates to SA-5(a),SA-5(b),SA-5(c), SA-22(b); CCIs: CCI-003124, CCI-003125, CCI-003126, CCI-003127, CCI-003128, CCI-003129, CCI-003130, CCI-003131, CCI-003374}

Provide a Control System Cybersecurity Documentation submittal containing the indicated information for each device and software application.

1.7.8.1 Software Applications

For all software applications running on computers provide:

a. administrator documentation that describes secure configuration of the software {For Government Reference Only: relates to CCI-003124}

b. administrator documentation that describes secure installation of the software and software updates. {For Government Reference Only: relates to CCI-003125}

c. administrator documentation that describes secure operation of the software {For Government Reference Only: relates to CCI-003124}

d. administrator documentation that describes effective use and maintenance of security functions or mechanisms for the software {For Government Reference Only: relates to CCI-003127}

e. administrator documentation that describes known vulnerabilities regarding configuration and use of administrative (i.e. privileged) functions for the software {For Government Reference Only: relates to CCI-003128}

f. user documentation that describes user-accessible security functions or mechanisms in the software and how to effectively use those security functions or mechanisms {For Government Reference Only: relates to CCI-003129}

g. user documentation that describes methods for user interaction which enables individuals to use the software in a more secure manner {For Government Reference Only: relates to CCI-003130}

h. user documentation that describes user responsibilities in maintaining the security of the software {For Government Reference Only: relates to CCI-003131}

1.7.8.2 For HVAC Control System Devices

1.7.8.2.1 HVAC Control System Devices FULLY Supporting User Accounts

For all HVAC Control System Devices which FULLY support user accounts, provide:

a. Documentation that describes secure configuration of the device {For Government Reference Only: relates to CCI-003124}

b. Documentation that describes secure operation of the device {For Government Reference Only: relates to CCI-003124}

c. Documentation that describes effective use and maintenance of security functions or mechanisms for the device {For Government Reference Only: relates to CCI-003127}

d. Documentation that describes known vulnerabilities regarding configuration and use of administrative (i.e. privileged) functions for the device {For Government Reference Only: relates to CCI-003128}

e. Documentation that describes user-accessible security functions or mechanisms in the device and how to effectively use those security functions or mechanisms; or a specific indication that there are no user-accessible security functions or mechanisms in the device {For Government Reference Only: relates to CCI-003129}

f. Documentation that describes methods for user interaction which enables individuals to use the device in a more secure manner {For Government Reference Only: relates to CCI-003130}

1.7.8.2.2 All Other HVAC Control System Devices

For all HVAC Control System Devices which do not FULLY support user accounts, provide:

a. Documentation that describes secure configuration of the device; or a specific indication that there are no secure configuration steps that apply {For Government Reference Only: relates to CCI-003124}

b. Documentation that describes effective use and maintenance of security functions or mechanisms for the device; or a specific indication that there are no security functions or mechanisms in the device {For Government Reference Only: relates to CCI-003127}

c. For devices which include a user interface, documentation that describes methods for user interaction which enables individuals to use the device in a more secure manner {For Government Reference Only: relates to CCI-003130}

1.7.8.3 For Lighting Control System Devices

1.7.8.3.1 Lighting Control System Devices FULLY Supporting User Accounts

For all Lighting Control System Devices which FULLY support user accounts, provide:

a. Documentation that describes secure configuration of the device {For Government Reference Only: relates to CCI-003124}

b. Documentation that describes secure operation of the device {For Government Reference Only: relates to CCI-003124}

c. Documentation that describes effective use and maintenance of security functions or mechanisms for the device {For Government Reference Only: relates to CCI-003127}

d. Documentation that describes known vulnerabilities regarding configuration and use of administrative (i.e. privileged) functions

for the device {For Government Reference Only: relates to CCI-003128}

e. Documentation that describes user-accessible security functions or mechanisms in the device and how to effectively use those security functions or mechanisms; or a specific indication that there are no user-accessible security functions or mechanisms in the device {For Government Reference Only: relates to CCI-003129}

f. Documentation that describes methods for user interaction which enables individuals to use the device in a more secure manner {For Government Reference Only: relates to CCI-003130}

1.7.8.3.2 All Other Lighting Control System Devices

For all Lighting Control System Devices which do not FULLY support user accounts, provide:

a. Documentation that describes secure configuration of the device; or a specific indication that there are no secure configuration steps that apply {For Government Reference Only: relates to CCI-003124}

b. Documentation that describes effective use and maintenance of security functions or mechanisms for the device; or a specific indication that there are no security functions or mechanisms in the device {For Government Reference Only: relates to CCI-003127}

c. For devices which include a user interface, documentation that describes methods for user interaction which enables individuals to use the device in a more secure manner {For Government Reference Only: relates to CCI-003130}

1.7.8.4 Default Requirements for Control System Devices

For control system devices where Control System Cybersecurity Documentation requirements are not otherwise indicated in this Section, provide:

a. Documentation that describes secure configuration of the device {For Government Reference Only: relates to CCI-003124}

b. Documentation that describes secure installation of the device {For Government Reference Only: relates to CCI-003125}

c. Documentation that describes secure operation of the device {For Government Reference Only: relates to CCI-003124}

d. Documentation that describes effective use and maintenance of security functions or mechanisms for the device {For Government Reference Only: relates to CCI-003127}

e. Documentation that describes known vulnerabilities regarding configuration and use of administrative (i.e. privileged) functions for the device {For Government Reference Only: relates to CCI-003128}

f. Documentation that describes user-accessible security functions or mechanisms in the device and how to effectively use those security functions or mechanisms {For Government Reference Only: relates to CCI-003129}

g. Documentation that describes methods for user interaction which enables individuals to use the device in a more secure manner {For Government Reference Only: relates to CCI-003130}

h. Documentation that describes user responsibilities in maintaining the security of the device {For Government Reference Only: relates to CCI-003131}

i. Documentation of the published last date of support by the manufacturer or indication that a published date is not available. {For Government Reference Only: relates to CCI-003374}

1.8 SOFTWARE LICENSING

{For Government Reference Only: This subpart (and its subparts) relates to SI-2(a), SI-2(c), SI-7(14); CCI-001227, CCI-002605, CCI-002737}

For all software provided that has not already been licensed to the government or project site, provide a license to the Government for a period of no less than 5 years, and the license must also include the following software updates:

a. Security and bug-fix patches issued by the software manufacturer.

b. Security patches to address any vulnerability identified in the National Vulnerability Database at http://nvd.nist.gov with a Common Vulnerability Scoring System (CVSS) severity rating of MEDIUM or higher.

Provide a single Software Licenses submittal with documentation of the software licenses for all software provided

1.9 CYBERSECURITY DURING CONSTRUCTION

{For Government Reference Only: This subpart (and its subparts) relates to AC-18, CA-3; CCI-000258}

In addition to the control system cybersecurity requirements indicated in this section, meet following requirement throughout the construction process.

1.9.1 Contractor Computer Equipment

Contractor owned computers may be used for construction. Contractor computers connected to the control system, control system network, or a control system component at any point during construction must meet the following requirements:

1.9.1.1 Operating System

The operating system must be an operating system currently supported by the manufacturer of the operating system. The operating system must be current on security patches and operating system manufacturer required updates.

1.9.1.2 Anti-Malware Software

The computer must run anti-malware software from a reputable software manufacturer. Anti-malware software must be a version currently supported

by the software manufacturer, must be current on all patches and updates, and must use the latest definitions file. Computers used on this project must perform a full antivirus scan at least once per day. Computers which have connected to any other network since the last full antivirus scan must perform a full antivirus scan prior to connection to the control system network or to the temporary contractor-installed IP network. Perform an antivirus scan on all removable media (e.g., external hard drives, CDs, DVDs, USB flash drives) prior to connecting to the control system environment.

1.9.1.3 Passwords and Passphrases

The passwords and passphrases for computers, applications, and web-based applications supporting passwords must be changed from their default values. Passwords must be a minimum of eight characters with a minimum of one uppercase letter, one lowercase letter, one number and one special character.

1.9.1.4 User-Based Authentication

Each user must have a unique account; sharing of a single account between multiple users is prohibited.

1.9.1.5 Demonstration of Compliance

The Government has the right to require demonstration of computer compliance with these requirements at any time during the project.

1.9.1.6 Contractor Computer Cybersecurity Compliance Statements

Provide a single submittal containing completed Contractor Computer Cybersecurity Compliance Statements for each company using contractor owned computers. Contractor Computer Cybersecurity Compliance Statements must use the template published at https://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/ufgs-25-05-11. Each Statement must be signed by a cybersecurity representative for the relevant company.

1.9.2 Temporary IP Networks

Temporary contractor-installed IP networks may be used during construction. When used, temporary contractor-installed IP networks connected to the control system, control system network, or a control system component at any point during construction must meet the following requirements:

1.9.2.1 Network Boundaries and Connections

The network must not extend outside the project site and must not connect to any IP network other than those specifically provided or furnished for this project. Any and all access to the network from outside the project site is prohibited.

1.9.3 Government Access to Network

Government personnel must be allowed to have complete and immediate access to the network at any time in order to verify compliance with this specification.

1.9.4 Temporary Wireless IP Networks

In addition to the other requirements on temporary IP networks, temporary wireless IP (WiFi) networks, when permitted, must not interfere with existing wireless networks, must use WPA2 security and must not broadcast the network name (SSID). Network names (SSID) for wireless networks must be changed from their default values.

1.9.5 Passwords and Passphrases

The passwords and passphrases for all network devices and network access must be changed from their default values. Passwords must be a minimum 8 characters with a minimum of one uppercase letter, one lowercase letter, one number and one special character.

1.9.6 Contractor Temporary Network Cybersecurity Compliance Statements

Provide a single submittal containing completed Contractor Temporary Network Cybersecurity Compliance Statements for each company implementing a temporary IP network. Contractor Temporary Network Cybersecurity Compliance Statements must use the template published at https://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/ufgs-25-05-11. Each Statement must be signed by a cybersecurity representative for the relevant company. If no temporary IP networks will be used, provide a single copy of the Statement indicating this.

1.10 CYBERSECURITY DURING WARRANTY PERIOD

All work performed on the control system after acceptance must be performed using Government Furnished Equipment or equipment specifically and individually approved by the Government.

PART 2 PRODUCTS

All products used on this project must meet the indicated requirements, but not all products specified here will be required by every project.

2.1 ETHERNET SWITCH

Provide Open Systems Interconnection (OSI) Layer 2 Ethernet switches with the following capabilities, and with an interface to support switch configuration for these capabilities:

2.1.1 Required Functionality

Switches must:

a. Copper Ethernet ports must auto negotiate for 10, 100 and 1000 megabits-per-second links.

b. Be capable of implementing port level access control by MAC address and limit the number of MAC addresses to one MAC address per port.

c. For MODERATE Impact Systems, be capable of implementing per-port access control lists (ACLs) where the list can be filtered by source and destination IP addresses, and by source and destination UDP or TCP ports.

d. For LOW Impact Systems, be capable of implementing per-port access control lists (ACLs) where the list can be filtered by source and destination IP addresses, and by source and destination UDP or TCP ports.

e. Support Remote Network Monitoring (RMON) Port Analysis in accordance with IETF RFC 2819

f. Configure target port and analysis port such that switch clones all target port traffic to analysis port.

g. Support authentication via RADIUS server (for management and 802.1x)

h. Support IEEE 802.1x network login.

2.1.2 Configuration Requirements

Switches must:

a. Support configuration save and restore.

b. Support both manual IP address assignment and acquisition of a dynamic IP address via Dynamic Host Configuration Protocol (DHCP).

c. Be capable of limiting access for configuration to one or more of: a web interface using HTTPS, a command line interface using SSH, or an SNMP connection using SNMP version 3 or later.

d. Support the ability to lock configuration capability to a dedicated management port.

2.2 DAISY CHAIN IP CONTROLLERS

Controllers used as Daisy Chain IP Controllers must be IP controllers with exactly two Ethernet network connections and basic built-in switch capabilities to allow implementation of an Ethernet network in a daisy chain architecture. Switches incorporated by Daisy Chain IP Controllers are not required to meet the requirements for Ethernet Switches as defined in this Section.

PART 3 EXECUTION

3.1 CYBERSECURITY HARDENING AND CONFIGURATION GUIDES

Install, configure, and harden all hardware and software furnished on this project in accordance with manufacturer provided documentation, procedures, or methods for secure configuration or installation. Do not implement specific hardening actions if that action would conflict with required functionality or another requirement of this Section.

3.2 NETWORK REQUIREMENTS

3.2.1 Information Flow Enforcement In MODERATE Impact Systems

{For Government Reference Only: This subpart (and its subparts) relate to AC-4; CCI-001368, CCI-001414, CCI-001548, CCI-001549, CCI-001550, CCI-001551}

Install and configure Ethernet switches to block all traffic on all ports

not required by the control protocol.

3.2.2 Wireless and Wired Broadcast Communication for Fire Protection Systems

The use of wireless and wired broadcast communication for fire protection systems within a facility is prohibited. Wireless communication may be used to provide communication from the fire protection system in a facility to the central monitoring station.

3.2.3 Wireless and Wired Broadcast Communication for Systems Other than Fire Protection Systems

{For Government Reference Only: This subpart (and its subparts) relates to AC-18, AC-18(3); CCI-001438, CCI-001439, CCI-002323, CCI-001441, CCI-001449}

Unless explicitly authorized by the Government, do not use any wireless or wired broadcast communication. If requesting authorization for wireless or wired broadcast communication, wired broadcast media such as powerline carrier is preferred to wireless.

3.2.3.1 Wireless and Wired Broadcast IP Communications

Do not install wireless or wired broadcast IP networks, including: do not install a wireless access point; do not install or configure an ad-hoc wireless network; do not install or configure a WiFi Direct communication.

When explicitly authorized by the Government, wireless IP communication may be used to communicate with an existing wireless network.

3.2.3.2 Non-IP Wireless Communication

For LOW Impact Systems: When non-IP wireless communication is explicitly authorized by the Government, use the maximum level of encryption supported by the specific protocol employed and select signal strength and radiated power to the minimum necessary for reliable communication.

For MODERATE Impact Systems: When non-IP wireless communication is explicitly authorized by the Government, the radios must meet NIST FIPS 140-2 Level 2.

3.2.3.3 Wireless and Wired Broadcast Communication Request

Provide a report documenting the proposed use of wireless or wired broadcast communication prior to device selection using the Wireless and Wired Broadcast Communication Request Schedule at https://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/ufgs-25-05-11. If there is no proposed use of wireless or wired broadcast communication, provide a document indicating this instead of the Request Schedule.

For each device proposed to use wireless or wired broadcast communication show: the device identifier, a description of the device, the location of the device, the device identifiers of other devices communicating with the device, the protocol used for communication, encryption type and strength. For wireless communication, also show: RF Frequency, Radiated Power in dBm (decibel with a milliwatt reference), free-space range, and the expected as-installed range.

3.2.3.4 Wireless Communication Testing

As part of Functional Performance Testing {FPT}, conduct testing of wireless communication for all devices indicated on the approved Wireless and Wired Broadcast Communication Request as requiring testing.

To test wireless communication, test for wireless network reception at multiple points along the wireless test boundary in the vicinity of the wireless device, and record whether a network connection can be established at each point. The wireless test boundary is the building exterior walls. If wireless testing is required, provide a Wireless Communication Test Report documenting the testing points and results at each point for each wireless device.

3.2.4 Non-IP Control Networks

When control system specifications require particular communication protocols, use only those communication protocols and only as specified. Do not implement any other communication protocol.

When control system specifications do not indicate requirements for communication protocols, use only those protocols required for operation of the system as specified.

3.2.5 IP Control Networks

{For Government Reference Only: This subpart relates to CM-6(a), CM-7(a), CM-7(b), CM-7(1)(b), SC-41; CCI-001588, CCI-000381, CCI-000380, CCI-000381, CCI-000382, CCI-001761, CCI-001762, CCI-002544, CCI-002545, CCI-002546. For Moderate Impact Systems, this subpart (and its subparts) also relates to SC-5(1), SC-5(2); CCI-001094 CCI-001095}

IP Networks must be Ethernet networks and must use switches which are Ethernet Switches or Daisy Chain IP Controllers as defined in this Section. Do not use nonsecure functions, ports, protocols and services as defined in DODI 8551.01 unless those ports, protocols and services are specifically required by the control system specifications or otherwise specifically authorized by the Government. Do not use ports, protocols and services that are not specified in the control system specifications or required for operation of the control system.

For MODERATE Impact Systems, unless explicitly authorized, do not use IP networks if the same control functionality is available through the use of non-IP networks.

3.2.5.1 IP Network Routers

Do not install any device that performs IP routing.

3.2.5.2 IP Devices With Multiple Ethernet Connections

Except for Ethernet Switches and Daisy Chain IP Controllers, devices must not have more than one Ethernet connection to IP networks unless doing so is required by the project specifications and the specific application is approved. If a device with Multiple Ethernet Connections to IP networks is required, provide a Multiple Ethernet Connection Device Request using the Multiple Ethernet Connection Device Request Template at https://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs

/ufgs-25-05-11 to request approval for each device. If a device with Multiple Ethernet Connections to IP networks is not required, instead provide a document stating that no approval is being requested.

3.2.6 Device Identification and Authentication

{For Government Reference Only: This subpart (and its subparts) relates to IA-3; CCI-000777, CCI-000778, CCI-001958. For MODERATE Impact systems, this subpart (and its subparts) also relates to SC-23, SC-23(5); CCI-001184, CCI-002470.}

All computers must support IEEE 802.1x for device authentication to the network.

3.2.6.1 For HVAC Control System Devices

Devices using HTTP as a control protocol must use HTTPS instead. Devices using Ethernet must support IEEE 802.1x.

3.2.6.2 For Lighting Control System Devices

Devices using HTTP as a control protocol must use HTTPS instead. Devices using Ethernet must support IEEE 802.1x.

3.2.6.3 Default Requirements for Control System Devices

For control system devices where Device Identification and Authentication requirements are not otherwise indicated in this Section: Devices using Ethernet must support IEEE 802.1x. Devices using HTTP as a control protocol must use HTTPS instead.

3.2.7 Cryptographic Module Authentication

{For Government Reference Only: This subpart (and its subparts) relates to IA-7; CCI-000803}

For devices (including but not limited to NIST FIPS 140-2 compliant radios) that have STIG/SRGs related to cryptographic module authentication (CCI-000803), comply with the requirements of those STIG/SRGs.

3.3 ACCESS CONTROL REQUIREMENTS

3.3.1 User Accounts

{For Government Reference Only: This subpart (and its subparts) relate to AC-2(a), AC-3, AC-6(1), AC-6(10), AC-6(2), AC-6(9), CM-11(2), and IA-2; CCI-002110, CCI-000213, CCI-001558, CCI-002221, CCI-002222, CCI-002223, CCI-002235, CCI-000039, CCI-001419, CCI-002234, CCI-001812, and CCI-000764. For MODERATE Impact systems, this subpart (and its subparts) also relate to AC-2 (2), AC-2(3), AC-2(4), AC-6(1), and CM-5(1); CCI-001361, CCI-000017, CCI-000217, CCI-000018, CCI-001403, CCI-001404, CCI-001405, CCI-002130, CCI-001683, CCI-001684, CCI-001685, CCI-001686, CCI-002132, CCI-001558, CCI-002221, CCI-002222, CCI-002223, CCI-001813.}

Any user interface supporting user accounts (either FULLY or MINIMALLY) must limit access according to specified limitations for each account. Install and configure any device having a STIG or SRG in accordance with that STIG or SRG.

All user interfaces FULLY supporting accounts must implement user-based authentication where each account is uniquely assigned to a specific user. User interfaces FULLY supporting accounts must implement at least three (3) levels of user account privilege including: 1) an account with read-only permissions 2) an account with full permissions including account creation and modification and 3) an account with greater permissions than read-only but without account creation and modification. Disable any unnecessary or unused accounts. Disable any "guest-level" accounts that are created on the system by default.

3.3.1.1 Computers

All computer operating systems must FULLY support user accounts and implement accounts for access. Each control system software application not supporting accounts and running on a computer must be installed such that use of the software is restricted by the computer operating system to specific users.

Applications running on computers must not require the user be logged in to a computer operating system administrator account for normal operation. It is permissible to require the computer operating system administrator account for initial application installation and configuration.

3.3.1.2 Controllers

For user interfaces provided by controllers, provide access control in accordance with the User Interface Requirements table for the applicable control system and user interface type.

a. For table entries of "NA": NA means Not Applicable, there are no interfaces in this category.

b. For table entries of "None Required": The user interface is not required to support user accounts.

c. For table entries of "MINIMALLY": The user interface must at least MINIMALLY support user accounts.

d. For table entries of "FULLY": The user interface must at FULLY support user accounts.

e. For table entries of "KEY": The user interface must have physical security in the form of either a key lock on the interface itself or be furnished inside a lockable enclosure. Where this is required for a read only interface, the lockable enclosure must prevent viewing of data on the interface; for other interfaces, this lockable enclosure must prevent using the interface to alter data.

f. For table entries of "Physical Security": For Local FULL interfaces, the interface must be located inside mission space. For Local Limited (not FULL) interfaces, the user interface must either a) be located within mission space or b) be protected by physical security at least as good as the control devices (and equipment controlled by the control devices) affected by the interface. For purposes of this requirement, 'affected' includes controllers with data that can be directly altered by the interface, as well as mechanical and/or electrical equipment directly controlled by those controllers, but does not include other interactions.

g. Entries of the form "X and Y" must meet both the requirement indicated for X and the requirement indicated for Y. For example, an entry of "MINIMALLY and Physical Security" indicates the user interface must both MINIMALLY support accounts and have physical security.

h. Entries of the form "X or Y" must meet either the requirement indicated for X or the requirement indicated for Y.

3.3.1.2.1 HVAC Control Systems

User Interface Requirements for LOW Impact HVAC Control Systems	
User Interface Type	**Access Control Requirement**
Local Read Only (see note 1)	None Required
Local Limited, Non-privileged	MINIMALLY
Local Limited, Privileged	MINIMALLY and/or Physical Security
Local Full	MINIMALLY
Remote Read Only	None Required
Remote Limited, Non-Privileged	MINIMALLY
Remote Limited, Privileged AND Remote Full (see note 2)	FULLY
Notes: 1)Local Read Only User Interfaces are always Non-Privileged 2)Remote Full User Interfaces are always Privileged	

3.3.1.2.2 Lighting Control Systems

User Interface Requirements for LOW Impact Lighting Control Systems	
User Interface Type	**Access Control Requirement**
Local Read Only (see note 1)	None Required
Local Limited, Non-privileged	MINIMALLY
Local Limited, Privileged	MINIMALLY and/or Physical Security
Local Full	MINIMALLY
Remote Read Only	None Required
Remote Limited, Non-Privileged	MINIMALLY

User Interface Requirements for LOW Impact Lighting Control Systems	
User Interface Type	**Access Control Requirement**
Remote Limited, Privileged AND Remote Full (see note 2)	FULLY
Notes: 1)Local Read Only User Interfaces are always Non-Privileged 2)Remote Full User Interfaces are always Privileged	

3.3.1.2.3 Electronic Security Systems (ESS)

User Interface Requirements for LOW Impact Electronic Security Systems	
User Interface Type	**Access Control Requirement**
Local Read Only (see note 1)	MINIMALLY
Local Limited, Non-privileged	NA
Local Limited, Privileged	FULLY
Local Full	FULLY and Physical Security
Remote Read Only	MINIMALLY
Remote Limited, Non-Privileged	NA
Remote Limited, Privileged AND Remote Full (see note 2)	FULLY
Notes: 1)Local Read Only User Interfaces are always Non-Privileged 2)Remote Full User Interfaces are always Privileged	

User Interface Requirements for MODERATE Impact Electronic Security Systems	
User Interface Type	**Access Control Requirement** (See note 3)
Local Read Only (see note 1)	MINIMALLY
Local Limited, Non-privileged	NA
Local Limited, Privileged	FULLY
Local Full	FULLY and Physical Security

User Interface Requirements for MODERATE Impact Electronic Security Systems	
User Interface Type	**Access Control Requirement** (See note 3)
Remote Read Only	MINIMALLY
Remote Limited, Non-Privileged	NA
Remote Limited, Privileged AND Remote Full (see note 2)	FULLY

Notes:
1)Local Read Only User Interfaces are always Non-Privileged
2)Remote Full User Interfaces are always Privileged
3)Devices outside mission space require physical security protections as indicated (in "PHYSICAL SECURITY IN MODERATE IMPACT SYSTEMS")

3.3.1.2.4 Fire Protection Systems

User Interface Requirements for LOW Impact Fire Protection Systems	
User Interface Type	**Access Control Requirement**
Local Read Only (see note 1)	None Required
Local Limited, Non-privileged	KEY or MINIMALLY
Local Limited, Privileged	KEY and Physical Security
Local Full	KEY
Remote Read Only	None Required
Remote Limited, Non-Privileged	MINIMALLY
Remote Limited, Privileged AND Remote Full	FULLY

Notes:
1)Local Read Only User Interfaces are always Non-Privileged

User Interface Requirements for MODERATE Impact Fire Protection Systems	
User Interface Type	**Access Control Requirement** (See note 2)
Local Read Only	None Required
Local Limited, Non-privileged	KEY or MINIMALLY
Local Limited, Privileged	FULLY

User Interface Requirements for MODERATE Impact Fire Protection Systems	
User Interface Type	**Access Control Requirement** (See note 2)
Local Full	KEY
Remote Read Only	MINIMALLY
Remote Limited, Non-Privileged	FULLY
Remote Limited, Privileged AND Remote Full	FULLY
Notes: 1)Local Read Only User Interfaces are always Non-Privileged 2)Devices outside mission space require physical security protections as indicated (in "PHYSICAL SECURITY IN MODERATE IMPACT SYSTEMS")	

3.3.1.3 Additional User Account Expiration Requirements In MODERATE Impact Systems:

In addition to other user account requirements, user account expiration and auditing must be configured as indicated.

3.3.1.3.1 For Control System Applications Running on Computers

If temporary accounts are supported, expire temporary accounts 72 hours after creation. Expire all other accounts after 35 days of inactivity.

3.3.1.3.2 For Other Control System Devices FULLY Supporting Accounts

If temporary accounts are supported, expire temporary accounts 72 hours after creation. Expire all other accounts after 365 days of inactivity.

3.3.2 Unsuccessful Logon Attempts

{For Government Reference Only: This subpart (and its subparts) relate to AC-7 (a), AC-7 (b); CCI-000043, CCI-000044, CCI-001423, CCI-002236, CCI-002237, CCI-002238}

Except for high availability user interfaces indicated as exempt, devices must meet the indicated requirements for handling unsuccessful logon attempts. If a device cannot meet these requirements, document device capabilities to protect from subsequent logon attempts and propose alternate protections in a Device Account Lock Exception Request submittal. Do not implement alternate protection measures in lieu of the indicated requirements without explicit permission from the Government. If no Device Account Lock Exceptions are requested, provide a document stating that no approval is being requested as the Device Account Lock Exception Request.

3.3.2.1 Devices MINIMALLY Supporting Accounts

For LOW Impact Systems: Devices which MINIMALLY (but not FULLY) support accounts must lock the user account after five consecutive failed login

attempts and must unlock the user account after 15 minutes have elapsed without an unsuccessful login attempt or by a successful login to a separate administrator account.

For MODERATE Impact Systems: Devices which MINIMALLY (but not FULLY) support accounts must lock the user accountafter five consecutive failed login attempts and must unlock the user account after 60 minutes have elapsed without an unsuccessful login attempt or by a successful login to a separate administrator account.

3.3.2.2 Devices FULLY Supporting Accounts

Devices which FULLY support accounts must meet the following requirements.

a. It must lock the user account when three unsuccessful logon attempts occur within a 15 minute interval.

b. Once an account is locked, the account must stay locked until unlocked by an administrator. If the account being locked is the sole administrator account on the device, the account must stay locked for 1 hour and then automatically unlock.

c. Once the indicated number of unsuccessful logon attempts occurs, delay further logon prompts by 5 seconds.

3.3.2.3 High Availability Interfaces Exempt from Unsuccessful Logon Attempts Requirements

The following high availability interfaces are exempt from unsuccessful logon attempts requirements:

High Availability Interfaces Exempt from Unsuccessful Logon Attempts Requirements		
User Interface	**Location**	**Action to take in lieu of locking screen**
FLS interfaces here	TBD	Return to user logon screen

3.3.3 System Use Notification

{For Government Reference Only: This subpart (and its subparts) relates to AC-8; CCI-000048, CCI-002247, CCI-002243, CCI-002244, CCI-002245, CCI-002246, CCI-000050, CCI-002248}

3.3.3.1 System Use Notification for Remote User Interfaces

Remote user interfaces must display a warning banner meeting the requirements of DTM 08-060 on screen.

3.3.3.2 System Use Notification for Local User Interfaces

Devices which are connected to a network and have a local user interface must display a warning banner meeting the requirements of DTM 08-060 on the user interface screen if capable of doing so and must have a permanently affixed label with an approved banner from DTM 08-060 if unable to display the warning banner on the screen. Where it is impractical (perhaps due to device size) to affix the label to the device, affix the label to the device enclosure.

Labels must be machine printed or engraved, plastic or metal, designed for

permanent installation, must use a font no smaller than 14 point, and must provide a high contrast between font and background colors.

3.3.4 Session Lock and Session Termination Requirements In MODERATE Impact Systems:

{For Government Reference Only: This subpart (and its subparts) relates to AC-11(a), AC-11(b), AC-11(1), AC-12, SC-10; AC-10; CCI-000058, CCI-000059, CCI-000056, CCI-000057, CCI-000060, CCI-002360, CCI-002361, CCI-001133, CCI-001134, CCI-000054, CCI-000055, CCI-002252}

3.3.4.1 Session Termination

When session termination is required for a User Interface, the User Interface must implement session termination a) based on manual initiation, or b) based on lack of activity, or c) based on either manual initiation or lack of activity, as indicated.

Session Termination must result in logging out the user. A logged out User Interface may only perform actions as indicated in the "Permitted Actions Without Identification or Authentication" subpart of this Section or display a publicly viewable image or blank screen. User Interfaces must remain logged out (session terminated) until a user enters correct authentication information, which must initiate a new session. All User Interfaces running on computers and all Remote User Interfaces must also terminate network connections as part of session termination.

3.3.4.2 Session Lock

When session lock is required for a User Interface, the User Interface must implement session lock a) based on manual initiation, or b) based on lack of activity, or c) based on either manual initiation or lack of activity, as indicated.

Session lock must result in the User Interface being suspended and the user interface must display a publicly viewable image or blank screen. No interaction with the user interface must be possible until either a) the same user enters valid authentication information, in which case that session must be continued, or b) until a different user enters valid authentication information at which point the first session must be terminated and a new session initiated for the new user.

3.3.4.3 Session Lock and Termination for Computers

Except as shown in the Session Lock and Session Termination Exception Table, User Interface sessions provided by computer operating systems must support the requirement for both Session Lock and Session Termination. Session Lock and Session Termination must be capable of being initiated by the user and must also be initiated by lack of activity. Session Lock must occur after 15 minutes of inactivity, and Session Termination must occur after 30 minutes total of inactivity (including, not in addition to, the time for Session Lock). When a user initiates a new session, terminate existing sessions if necessary to limit the total number of concurrent sessions to 1.

Except as shown in the Session Lock and Session Termination Exception Table, Other User Interface sessions running on computers (for local user interfaces) or hosted on a computer (for remote user interfaces) and supporting accounts must support user initiation of Session Termination

and session lock. Session lock may be initiated by user initiation or automatically after 15 minutes of inactivity. In addition, remote User Interface sessions must also initiate Session Termination after 30 minutes of inactivity unless otherwise indicated in the Session Lock and Termination Exceptions table.

3.3.4.4 Session Lock and Termination for Controllers

Except as shown in the Session Lock and Session Termination Exception Table, Writable Remote User Interfaces must support requirements for Session Termination, and must both be capable of being initiated by the user and initiated by lack of activity. Session Termination must initiate after 30 minutes of inactivity.

Except as shown in the Session Lock and Session Termination Exception Table, Local User Interfaces supporting accounts must support manual initiation of Session Termination. Privileged Local User Interfaces must also support timed initiation of Session Termination, unless otherwise indicated in the Session Lock and Termination Exceptions table, with Session Termination initiated at 30 minutes of inactivity.

3.3.4.5 Session Lock and Termination Exceptions

Table: Session Lock and Termination Exceptions

Device	**Location**	**Session Lock and Termination Requirements for Device (or "none" to indicate session lock or session termination is not required)**
FLS devices here	TBD	Return to user logon screen

3.3.5 Permitted Actions Without Identification or Authentication

{For Government Reference Only: This subpart (and its subparts) relates to AC-14; CCI-000061, CCI-000232}

The control system must require identification and authentication before allowing any actions except read-only actions by a user acting from a user interface which MINIMALLY or FULLY supports accounts.

3.3.6 Physical Security in MODERATE Impact Systems

{For Government Reference Only: This subpart relates to PE-3(1), PE-4, PE-5, SC-7(a), SC-7(c), SC-8, SC-8(1); CCI-000928, CCI-002926, CCI-000936, CCI-002930, CCI-002931, CCI-000937, CCI-001097, CCI-001109, CCI-002418, CCI-002419, CCI-002421.}

3.3.6.1 Physical Security for Media

3.3.6.1.1 Physical Security for Media Inside Mission Space

Install all non-IP network media located inside of the mission space in conduit. Install all IP network media located inside of the mission space in intermediate metallic conduit.

3.3.6.1.2 Physical Security for Media Outside Mission Space

Install all network media (both IP and non-IP) located outside of the

mission space in rigid metallic conduit.

3.3.6.1.3 Physical Security for Non-Network Media in Fire Protection Systems

For Fire Suppression Systems which can be inhibited or forced to activate by manipulation of non-network wiring, install all non-network media outside of mission space, including analog and binary instrumentation wiring and power wiring, in rigid metallic conduit.

3.3.6.2 Physical Security for Devices

Install all devices (computers and controllers) which are located outside of mission space in lockable enclosures. (Recall that per definition of mission space, a room controlled by the mission is mission space regardless of whether it is contiguous with other mission space.)

Install all controllers connected to an IP network in lockable enclosures (both inside and outside of mission space).

3.3.6.2.1 Physical Security for Devices in Fire Protection Systems

For Fire Suppression systems with a release panel, install all components of the suppression system either inside mission space, or within locked enclosures. Components of these systems include: release panel, any relay or interface panels, analog and binary inputs or outputs, control valves, manual valves.

3.3.6.3 Physical Security for User Interfaces

Physical security requirements for User Interfaces are specified in the preceding paragraphs of this Section.

3.3.7 Enclosures

Prior to final acceptance of the system, lock all lockable enclosures. Submit an Enclosure Keys submittal with all copies of keys for all enclosures and a key inventory list documenting all keys. Label each key with the matching enclosure identifier.

3.4 USER IDENTIFICATION AND AUTHENTICATION

{For Government Reference Only: This subpart (and its subparts) relates to IA-2, IA-2(1),IA-2(12), IA-5 IA-5(b), IA-5(c), IA-5(e), IA-5(g), IA-5(1), IA-5(11); CCI-000764, CCI-000765, CCI-001953, CCI-001954, CCI-001544, CCI-001989, CCI-000182, CCI-001610, CCI-000192, CCI-000193, CCI-000194, CCI-000205, CCI-001619, CCI-001611, CCI-001612, CCI-001613, CCI-001614, CCI-000195, CCI-001615, CCI-000196, CCI-000197, CCI-000199, CCI-000198, CCI-001616, CCI-001617, CCI-000200, CCI-001618, CCI-002041, CCI-002002, CCI-002003. For MODERATE Impact systems, this subpart also relates to AC-6 (1), AC-6(10), AC-6(2), AC-6(9)-IA-2(4), IA-5(13); CCI-001558, CCI-002221, CCI-002222, CCI-002223, CCI-002235, CCI-000039, CCI-001419, CCI-002234, CCI-000768, CCI-002007.}

This subpart indicates requirements for specific methods of identification and authentication for users and user accounts. Where these requirements conflict apply the following order of precedence: 1) If present, Device Specific Requirements take precedence over any other requirements; and then 2) multifactor authentication requirements take precedence over

password requirements.

3.4.1 User Identification and Authentication for All System Types

Unless otherwise indicated, all user interfaces supporting accounts (either FULLY or MINIMALLY) must implement Identification and Authorization via passwords.

For LOW Impact Systems: User interfaces provided by computer operating systems must implement multifactor authentication via PIV.

For MODERATE Impact Systems:User interfaces supporting accounts (FULLY or MINIMALLY) on computers must implement multifactor authentication via PIV. Software running on computers and computer operating systems must manage cached authenticators in accordance with the relevant STIGs. All other devices and software must not use cached authenticators.

3.4.2 User Identification and Authentication for Specific System Types

System specific requirements are in addition to and supersede those indicated for all system types. When no additional requirements are indicated for a specific system type the requirements for all systems still apply to that system type.

3.4.2.1 HVAC Control Systems Devices

No additional system specific requirements apply.

3.4.2.2 Lighting Control Systems Devices

No additional system specific requirements apply

3.4.2.3 Electronic Security System Devices

User interfaces which FULLY support accounts and which run on a computer must use multifactor authentication via PIV. User interfaces which MINIMALLY support accounts must use either passwords or multifactor authentication via PIV.

3.4.3 User Identification and Authentication for Specific Devices

There are no additional device specific user interface requirements

3.4.4 Implementation of Identification and Authorization Requirements

Identification and Authorization must be met by one of the following methods:

a. Direct implementation in the user interface.

b. For user interfaces on a computer: inheriting the Identification and Authorization from the computer operating system, either by the operating system limiting access to specific applications by user, or by the application itself having permissions based on the user logged into the computer.

c. For remote interfaces: an implementation shared between the remote user interface server and the remote user interface client. For example, a requirement for PIV authentication may be met on a remote

user interface by a PIV reader on a web browser client which sends the authentication information via HTTPS to the remote server.

3.4.5 Password-Based Authentication Requirements

3.4.5.1 Passwords for Software and Applications Running on Computers

All software and applications running on computers supporting password-based authentication must enforce the following requirements:

a. Minimum password length of 12 characters

b. Password must contain at least one uppercase character.

c. Password must contain at least one lowercase character.

d. Password must contain at least one numeric character.

e. Password must contain at least one special character. The list of supported special characters must include at least 4 separate characters.

f. Password must have a minimum lifetime of 24 hours.

g. Password must have a maximum lifetime of 60 days. When passwords expire, prompt users to change passwords. Do not lock accounts due to expired passwords.

h. Password must differ from previous five passwords, where differ is defined as changing at least 50 percent of the characters (where location is significant, a character may be reused if it is in a different position).

i. Passwords must be cryptographically protected during storage and transmission.

3.4.5.2 Passwords for Controllers FULLY Supporting Accounts

All controllers FULLY supporting accounts and supporting password-based authentication must enforce the following requirements:

a. Minimum password length of 12 characters

b. Password must contain at least one uppercase character.

c. Password must contain at least one lowercase character.

d. Password must contain at least one numeric character.

e. Password must contain at least one special character. The list of supported special characters must include at least 4 separate characters.

f. Password must have a maximum lifetime of sixty (60) days. When passwords expire, prompt users to change passwords. Do not lock accounts due to expired passwords.

g. Password must differ from previous five passwords, where differ is defined as changing at least 50 percent of the characters.

h. Passwords must be cryptographically protected during storage and transmission.

3.4.5.3 Passwords for Remote Interfaces

Passwords for connecting to a Remote User Interface supporting password-based authentication must enforce the following requirements:

a. Minimum password length of 12 characters

b. Password must contain at least one uppercase character.

c. Password must contain at least one lowercase character.

d. Password must contain at least one numeric character.

e. Password must contain at least one special character. The list of supported special characters must include at least 4 separate characters.

f. Password must have a maximum lifetime of 60 days. When passwords expire, prompt users to change passwords. Do not lock accounts due to expired passwords.

g. Password must differ from previous five passwords, where differ is defined as changing at least 50 percent of the characters (where location is significant, a character may be reused if it is in a different position).

h. Passwords must be cryptographically protected during storage and transmission.

3.4.5.4 Passwords for Devices Minimally Supporting Accounts

Devices MINIMALLY supporting accounts must support passwords with a minimum length of four characters.

3.4.5.5 Password Configuration and Reporting

For all devices with a password, change the password from the default password. Coordinate selection of passwords with the Password Point of Contact. Do not use the same password for more than one device unless specifically instructed to do so. Provide a Confidential Password Report documenting the password for each device and describing the procedure to change the password for each device.

Do not provide the Password Summary Report in electronic format. Provide two hardcopies of the Password Summary Report, each copy in its own sealed envelope.

3.4.6 Authenticator Feedback

{For Government Reference Only: This subpart relates to IA-6; CCI-000206}

Devices must never show authentication information, including passwords, on a display. Devices that momentarily display a character as it is entered, and then obscure the character, are acceptable. For devices that

have STIGs or SRGs related to obscuring of authenticator feedback (CCI-000206), comply with the requirements of those STIGS/SRGs.

3.5 CYBERSECURITY AUDITING

Where an auditing requirement exists for email notification, notify via email the application administrator and Information System Security Officer (ISSO) of the event. Coordinate with the Email Address Point of Contact for email addresses. If outgoing email is not available to the system, disable email notifications.

3.5.1 Audit Events, Content of Audit Records, and Audit Generation

{For Government Reference Only: This subpart (and its subparts) relates to AU-2(a), AU-2(c), AU-2(d), AU-3, AU-10, AU-12, AU-14(b), AU-14(1), AU-14(2), AU-14(3), CM-5(1), SC-7 (9); CCI-000123, CCI-001571, CCI-000125, CCI-001485, CCI-000130, CCI-000131, CCI-000132, CCI-001230, CCI-000133, CCI-000134, CCI-001487, CCI-000166, CCI-001899, CCI-000169, CCI-001459, CCI-000171, CCI-000172, CCI-001910, CCI-001914, CCI-001919, CCI-001464, CCI-001462, CCI-001920, CCI-001814, CCI-002400. For MODERATE Impact systems, this subpart (and its subparts) also relates to AU-3 (1); CCI-000135, CCI-001488}

For devices that have STIG/SRGs related to audit events, content of audit records or audit generation, comply with the requirements of those STIG/SRGs.

If auditing requirements can be met using existing control system alarm or event capabilities, those existing capabilities may be used to meet these requirements.

3.5.1.1 Computers

For each computer, provide the capability to select audited events and the content of audit logs. Configure computers to audit the indicated events, and to record the indicated information for each auditable event. Send logs to a syslog server that is only accessible via accounts on the system with privileged level access.

3.5.1.1.1 Audited Events

Configure each computer to audit the following events:

a. Successful and unsuccessful attempts to access, modify, or delete privileges, security objects, security levels, or categories of information (e.g. classification levels)

b. Successful and unsuccessful logon attempts

c. Successful logouts

d. Privileged activities or other system level access

e. Concurrent logons from different workstations

f. Successful and unsuccessful accesses to objects

g. Program initiations

h. Direct access to the information system

i. Account creations, modifications, disabling, and terminations. For MODERATE Impact Systems, also provide email notification when these audit events occur.

j. Kernel module load, unload, and restart

3.5.1.1.2 Audit Event Information To Record

Configure each computer to record, for each auditable event, the following information (where applicable to the event):

a. What type of event occurred

b. When the event occurred

c. Where the event occurred

d. The source of the event

e. The outcome of the event

f. The identity of any individuals or subjects associated with the event

g. For MODERATE Impact Systems: For all privileged commands, full-text recording of the executed command and the user executing the command

For MODERATE Impact Systems: Audit records must provide sufficient detail to reconstruct events to determine cause of compromise and magnitude of damage, malfunction, or security violation.

3.5.1.2 For HVAC Control System Controllers

3.5.1.2.1 HVAC Control System Controllers FULLY Supporting User Accounts

For each controller which FULLY supports accounts, provide the capability to select audited events and the content of audit logs. Configure controllers to audit the indicated events, and to record the indicated information for each auditable event.

3.5.1.2.1.1 Audited Events

Configure each controller to audit the following events:

a. Successful and unsuccessful logon attempts to the controller

b. Successful logouts

c. All account creations, modifications, disabling, and terminations. For MODERATE Impact Systems, also provide email notification when these audit events occur.

d. All controller shutdown and startup

e. For privileged user interfaces in MODERATE Impact Systems: All user commands.

3.5.1.2.1.2 Audit Event Information To Record

Configure each controller to record, for each auditable event, the following information (where applicable to the event):

a. what type of event occurred

b. when the event occurred

c. the identity of any individuals or subjects associated with the event

d. For privileged user interfaces in MODERATE Impact Systems: Full text recording of the executed command and the user executing the command.

For MODERATE Impact Systems: Audit records must provide sufficient detail to reconstruct events to determine cause of compromise and magnitude of damage, malfunction, or security violation.

3.5.1.2.2 Other HVAC Control System Controllers

There are no requirements to perform auditing at HVAC field controllers that do not FULLY support accounts.

3.5.1.3 For Lighting Control System Controller

3.5.1.3.1 Lighting Control System Controllers FULLY Supporting User Accounts

For each controller which FULLY supports accounts, provide the capability to select audited events and the content of audit logs. Configure controllers to audit the indicated events, and to record the indicated information for each auditable event.

3.5.1.3.1.1 Audited Events

Configure each controller to audit the following events:

a. Successful and unsuccessful logon attempts to the controller

b. Successful logouts

c. All account creations, modifications, disabling, and terminations. For MODERATE Impact Systems, also provide email notification when these audit events occur.

d. All controller shutdown and startup

e. For privileged user interfaces in MODERATE Impact Systems: All user commands.

3.5.1.3.1.2 Audit Event Information To Record

Configure each controller to record, for each auditable event, the following information (where applicable to the event):

a. what type of event occurred

b. when the event occurred

c. the identity of any individuals or subjects associated with the event

d. For privileged user interfaces in MODERATE Impact Systems: Full text recording of the executed command and the user executing the command.

For MODERATE Impact Systems: Audit records must provide sufficient detail to reconstruct events to determine cause of compromise and magnitude of damage, malfunction, or security violation

3.5.1.3.2 Other Lighting Control System Controllers

There are no requirements to perform auditing at Lighting field controllers that do not FULLY support accounts.

3.5.1.4 Default Requirements for Control System Controllers

For control system controllers where Audit Events, Content of Audit Records, and Audit Generation are not otherwise indicated in this Section:

3.5.1.4.1 Controllers Which FULLY Support Accounts

For each controller which FULLY supports accounts, provide the capability to select audited events and the content of audit logs. Configure controllers to audit the indicated events, and to record the indicated information for each auditable event.

3.5.1.4.1.1 Audited Events

Configure each controller to audit the following events:

a. Successful and unsuccessful attempts to access, modify, or delete privileges, security objects, security levels, or categories of information (e.g. classification levels)

b. Successful and unsuccessful logon attempts

c. Successful logouts

d. Concurrent logons from different workstations

e. All account creations, modifications, disabling, and terminations. For MODERATE Impact Systems, also provide email notification when these audit events occur.

f. All kernel module load, unload, and restart

g. For privileged user interfaces in MODERATE Impact Systems: All user commands.

3.5.1.4.1.2 Audit Event Information To Record

Configure each controller to record, for each auditable event, the following information (where applicable to the event):

a. what type of event occurred

b. when the event occurred

c. where the event occurred

d. the source of the event

e. the outcome of the event

f. the identity of any individuals or subjects associated with the event

g. For privileged user interfaces in MODERATE Impact Systems: Full text recording of the executed command and the user executing the command.

For MODERATE Impact Systems: Audit records must provide sufficient detail to reconstruct events to determine cause of compromise and magnitude of damage, malfunction, or security violation

3.5.1.4.2 Controllers Which Do Not FULLY Support Accounts

For each controller which does not FULLY support accounts configure the controller to audit all controller shutdown and startup events and to record for each event the type of event and when the event occurred.

3.5.2 Audit Time Stamps

{For Government Reference Only: This subpart (and its subparts) relates to AU-8; CCI-000159, CCI-001889, CCI-001890. For MODERATE Impact systems, this subpart (and its subparts) also relates to AU-8 (1); CCI-001891, CCI-001892, CCI-002046.}

Any device (computer or controller) generating audit records must have an internal clock capable of providing time with a resolution of one second. Clocks must not drift more than 10 seconds per day. Configure the system so that each device (computer or controller) generating audit records maintains accurate time to within 1 second. Note that if the control system specifications include requirement for clocks, the most stringent requirement applies.

3.5.3 Audit Storage Capacity and Audit Upload

{For Government Reference Only: This subpart (and its subparts) relates to AU-4; CCI-001848, CCI-001849}

The creation of audit records must never interfere with normal device operation. Devices must cease collection of auditing information if required to maintain normal operation.

a. For devices that have STIG/SRGs related to audit storage capacity (CCI-001848 or CCI-001849) comply with the requirements of those STIG/SRGs.

b. For controllers capable of generating audit records, provide 60 days worth of secure local storage, assuming 10 auditable events per day.

c. For computers, provide storage for at least 180 audit records.

3.5.3.1 Audit Log Storage Notification In MODERATE Impact Systems

{For Government Reference Only: This subpart (and its subparts) relates to AU-5(1); CCI-001855.}

Controllers storing audit logs must provide notification when audit logs

reach 75 percent of capacity either directly through email or indirectly by sending a notification to a computer, and the computer sending an email. Computers storing audit logs must provide notification when audit logs reach 75 percent of capacity directly through email.

3.5.4 Response to Audit Processing Failures

{For Government Reference Only: This subpart (and its subparts) relates to AU-5; CCI-000139, CCI-000140, CCI-001490.}

In the case of a failure in the auditing system, computers associated with auditing must provide email notification. For MODERATE Impact systems, the computer must also notify the associated auditing front end software. In case of an audit failure, if possible, continue to collect audit records by overwriting existing audit records.

For MODERATE Impact Systems: In the case of an audit failure at a controller performing auditing, the device must notify the associated auditing front end software of the audit failure if able, and must continue to collect audit records by overwriting existing audit records if able. The auditing front end software must provide notification as indicated, treating the notification of failure from the device as a failure in the auditing system.

3.6 REQUIREMENTS FOR LEAST FUNCTIONALITY

{For Government Reference Only: This subpart (and its subparts), along with the Network Communication, Ports, Protocols and Services Report submittal specified elsewhere in this section, relates to CM-6(a), CM-6(c), CM-7, CM-7(1)(b), SC-41; CCI-000363, CCI-000364, CCI-000365, CCI-001588, CCI-001755, CCI-000381, CCI-000380, CCI-000382, CCI-001761, CCI-001762, CCI-002544, CCI-002545, CCI-002546. For MODERATE Impact systems, this subpart (and its subparts) also relates to CM-7(2), CM-7(5)(a), CM-7(5)(b); CCI-000381, CCI-000380, CCI-000382, CCI-001761, CCI-001762}

For devices that have a STIG or SRG related to Requirements for Least Functionality (such as configuration settings and port and device I/O access for least functionality), install and configure the device in accordance with that STIG or SRGs.

3.6.1 Device Capabilities

For HVAC Control Systems: Do not provide devices with remote user interfaces or with full user interfaces where one was not required. Do not use a networked sensor or actuator where a non-networked sensor or actuator would suffice.

For Lighting Control Systems: Do not provide devices with remote user interfaces or with full user interfaces where one was not required.

For Other Control Systems: For LOW Impact Systems: Do not provide devices with remote user interfaces or with full user interfaces where one was not required. Do not use a networked sensor or actuator where a non-networked sensor or actuator would suffice.

For Other Control Systems: For MODERATE Impact Systems: Do not provide devices with remote user interfaces or full user interfaces where one was not required. Do not use a networked sensor or actuator where a

non-networked sensor or actuator would suffice.

For all MODERATE Impact Systems: Unless specifically required by the government, do not provide a capability to update device firmware over the network.

3.6.2 Software

For software that has a STIG or SRG related to Requirements for Least Functionality (such as configuration settings and port access for least functionality), install and configure the software in accordance with that STIG or SRG.

Do not install software that is not specifically required to meet a contract requirement. Remove any previously installed that is not specifically required to meet a contract requirement. Do not implement functionality within software
that is not specifically required to meet contract requirements.

3.7 SYSTEM AND COMMUNICATION PROTECTION

3.7.1 Collaborative Computing

{For Government Reference Only: This subpart relates to SC-15(a), SC-15(b); CCI-001150, CCI-001152.}

Without explicit approval from the project site, control systems must not use collaborative computing technologies.

3.7.2 Denial of Service Protection and Application Partitioning In MODERATE Impact Systems:

{For Government Reference Only: This subpart relates to SC-5, SC-12, SC-7(a); CCI-001093, CCI-002385, CCI-002386, CCI-002430, CCI-001097. For MODERATE Impact systems, this subpart also relates to SC-2; CCI-001082.}

To the greatest extent practical, implement control logic without reliance on the network. Except when required to meet the requirements of the control system Section (where the requirement can only be met using computer hardware), do not implement control logic in computers. For MODERATE Impact systems, do not implement control logic in a device providing (i.e. acting as a server for) a Full Remote User Interface.

3.7.2.1 Network Reliance in MODERATE Impact HVAC Control Systems

Except for networked input and outputs on input-output buses specifically designed to provide high reliability or redundancy, sensors and actuators must not rely on the network to exchange data with the controller executing the sequence of operation which uses the sensor value or determines the actuator command.

Sensor values required by multiple devices may be shared over the network provided they are connected to a controller requiring the value for execution of the sequence and that controller shares the value on the network.

3.7.2.2 Network Reliance in MODERATE Impact Lighting Control Systems

Except for networked input and outputs on input-output buses specifically

designed to provide high reliability or redundancy, sensors and actuators must not rely on the network to exchange data with the controller executing the sequence of operation which uses the sensor value or determines the actuator command.

Sensor values required by multiple devices may be shared over the network provided they are connected to a controller requiring the value for execution of the sequence and that controller shares the value on the network.

3.7.2.3 Default Requirements for MODERATE Impact Control Systems

Except for networked input and outputs on input-output buses specifically designed to provide high reliability or redundancy, sensors and actuators must not rely on the network to exchange data with the controller executing the sequence of operation which uses the sensor value or determines the actuator command.

Sensor values required by multiple devices may be shared over the network provided they are connected to a controller requiring the value for execution of the sequence and that controller shares the value on the network.

3.7.3 Mobile Code In MODERATE Impact Systems:

{For Government Reference Only: This subpart relates to SC-18(a), SC-18(b),
SC-18(c), SC-18(1), SC-18(3), SC-18(4); CCI-001160, CCI-001161, CCI-001162, CCI-001163, CCI-001164, CCI-001165, CCI-001166, CCI-001662, CCI-002457, CCI-002458, CCI-001169, CCI-001695, CCI-001170, CCI-002469}

Devices with STIGs/SRGs related to Mobile Code and to Security Control SC-18 must be installed in accordance with the relevant STIGs/SRGs. All remote user interfaces must meet the requirements of the "Web Browsers and Application SRG".

Mobile code may only be downloaded from a specifically authorized mobile code repository. Coordinate with the Mobile Code Point of Contact for the location of a repository.

3.7.4 Protection of Information at Rest In MODERATE Impact Systems:

{For Government Reference Only: This subpart relates to SC-28, SC-28(1); CCI-001199, CCI-002472, CCI-002475, CCI-002476}

Computers must protect information at rest in accordance with applicable STIGs.

Any control system device storing personally identifiable information (PII), controlled unclassified information (CUI), or classified information must be protected by an Information At Rest encryption solution or by a physical security solution. Provide a Protection of Information At Rest Proposal indicating each device storing PII, CUI, or classified information and the encryption or physical security solution proposed for that device for government approval. If no devices stores PII, CUI, or classified information, provide a document stating this as the Protection of Information At Rest Proposal submittal. Do proceed with device selection and installation until the Protection of Information At Rest Proposal is approved. Once approved, implement approved Information

At Rest protections.

3.7.5 Process Isolation and Boundary Protection in Moderate Impact Fire Protection Systems

{For Government Reference Only: This subpart relates to SC-7(a), SC-7(c), SC-7(4)(a), SC-7(4)(c), SC-7(5), SC-7(7), SC-7(9)(a), SC-7(11), SC-7(13), SC-7(13), SC-7(18); CCI-001097, CCI-001098, CCI-001102, CCI-002396, CCI-001109, CCI-002397, CCI-002398, CCI-002399, CCI-002403, CCI-001120, CCI-001119, CCI-001126}

3.7.5.1 Radio Interfaces for Fire Protection Systems

When radios interfacing a local fire protection system to a supervisory system are not NIST FIPS 140-2 validated, use a relay panel interface between the local fire protection system and the radio. Install and configure the relay panel to prohibit initiating any action within the local fire protection system other than causing the system to play a pre-recorded message or causing the system to play a live audio message. Install relays using the normally closed contact such that they pass a signal when they open, and so that a relay that loses power or has a failed coil passes the signal

3.7.5.2 Fire Suppression System Network Isolation

For fire suppression systems including a release panel, any network used in these systems must be dedicated to these systems and must be isolated from any other network, including other components of the Fire Alarm and Fire Suppression systems. Use only dry contacts and relays to transfer signals from these systems to any other systems. Install relays using the normally closed contact such that they pass a signal when they open, and so that a relay that loses power or has a failed coil passes the signal

3.8 SAFE MODE AND FAIL SAFE OPERATION

{For Government Reference Only: This subpart (and its subparts) relates to CP-12, SI-10(3), SI-17; CCI-002855, CCI-002856, CCI-002857, CCI-002754, CCI-002773, CCI-002774, CCI-002775}

For all control system components with an applicable STIG or SRG, configure the component in accordance with all applicable STIGs and SRGs.

3.9 SYSTEM MAINTENANCE TOOL SOFTWARE

{For Government Reference Only: This subpart (and its subparts) relates to MA-3; CCI-000865.}

Submit and license to the Government all software required to operate, maintain and modify the control system such the Government or their agents are able to perform repair, replacement, upgrades, and expansions of the system without subsequent or future dependence on the Contractor, Vendor or Manufacturer. Submit hard copies of user manuals for each software with the software submittal. Provide any hardware keys or dongles, software keys, license numbers, and other information required to enable the Government to access or change the system.

For software provided and licensed to the Government under the requirements of another Section, submit a statement indicating the Section and Submittal under which the software was provided. For software

provided to meet the requirements of this Section and not provided and licensed under another Section, submit software and software user manuals on DVD or CD as a Technical Data Package and submit one hard copy of the software user manual for each piece of software.

3.10 DEVICE POWER

{For Government Reference Only: This subpart (and its subparts) relates to PE-11, PE-11(1); CCI-002955, CCI-000961. For MODERATE Impact systems, this subpart (and its subparts) also relates to PE-9, PE-9(1); CCI-000952, CCI-002953, CCI-002954.}

For MODERATE Impact Systems: Provide control system with power supply meeting or exceeding the reliability of the controlled equipment. Powering control system devices using the same power source as the equipment controlled by the device is a permissible method of meeting this requirement. Without explicit approval from the government, do not install local uninterruptible power supplies (UPSes) as a source of device power.

3.10.1 Device Behavior on Loss of Power In MODERATE Impact Systems:

Application programs and configuration settings must be stored in devices in manner such that a loss of power does not result in a loss of the application program or configuration settings: Loss of power must never result in the loss of application programs, regardless of the length of time power is lost; and loss of power for less than 2,500 hours must not result in the loss of configured settings.

In the event of a loss of power, when power is restored, controllers and computers executing control logic (and the underlying equipment) must recover and resume their normal sequences of operation. Note that the sequence of operation may require specific actions (e.g. startup sequences) upon recovery from loss of power.

3.11 VULNERABILITY SCANNING

{For Government Reference Only: This subpart (and its subparts) relates to RA-5 RA-5(a),RA-5(b),RA-5(c),RA-5(d); CCI-001054, CCI-001055, CCI-000156, CCI-001641, CCI-001643, CCI-001057, CCI-001058, CCI-001059. For MODERATE Impact systems, this subpart (and its subparts) also relates to RA-5(1), RA-5(5); CCI-001062, CCI-001067, CCI-001645, CCI-002906.}

All IP devices must be scannable, such that the device can be scanned by industry standard IP network scanning utilities without harm to the device, application, or functionality.

3.11.1 Computers and Software Running on Computers

Computers and applications running on computers must meet relevant vulnerability scanning STIGs/SRGs and respond to approved DoD vulnerability scanning tools.

3.11.2 Controllers

Provide controllers that are scannable by standard control system discovery tools or control system browsers and return meaningful status information including the network inputs and outputs for the controller. This information must contain sufficient detail to detect vulnerabilities

or exploits of the controller.

Provide all software needed to scan the control system as the Control System Scanning Tools submittal. If the software required to scan the system is already installed at the project site or is provided under a separate section instead provide a statement indicating this.

3.12 FIPS 201-2 REQUIREMENT

{For Government Reference Only: This subpart (and its subparts) relates to SA-4 (10); CCI-003116}

Devices in the following systems which implement PIV must be on the NIST FIPS 201-2 approved product list (https://www.idmanagement.gov/approved-products-list/): NONE.

3.13 SYSTEM AND INTEGRATION INTEGRITY

3.13.1 Malicious Code Protection

{For Government Reference Only: This subpart (and its subparts) relates to SI-3(c); CCI-001241, CCI-002623}

For all computers installed under this project, provide malware protection software media, provide licenses, and install and configure malware protection software as indicated. Coordinate with the Government Computer Access Point of Contact as required.

a. Malware protection software licenses will be Government furnished.

b. Malware protection software media will be Government furnished.

c. Malware protection software will be Government installed.

3.13.2 Software, Firmware, and Information Integrity In MODERATE Impact Systems:

{For Government Reference Only: This subpart relates to CM-5(3); CCI-001749, CCI-002704, CCI-002726}

If there exists Integrity Verification Software that can check boot process, software, firmware, or information in the control system and verify its integrity, provide it. If no such software exists, provide a statement to this affect in lieu of the software.

3.14 CONTROL SYSTEM CYBERSECURITY TESTING

{For Government Reference Only: For MODERATE Impact systems, this subpart (and its subparts) relates to SA-11(a), SA-11(b), SA-11(c), SA-11(d), SA-11(e); CCI-003171, CCI-003172, CCI-003173, CCI-003174, CCI-003175, CCI-003176, CCI-003177, CCI-003178.}

3.14.1 Control System Cybersecurity Testing Procedures

Prepare and submit Control System Cybersecurity Testing Procedures explaining step-by-step, the actions and expected results that will demonstrate that the control system meets the requirements of this Section. The Control System Cybersecurity Testing Procedures may be submitted as a Technical Data Package.

3.14.2 Control System Cybersecurity Testing Execution

Using the Control System Cybersecurity Testing Procedures verify that the control system meets the requirements of this Section. UNLESS GOVERNMENT WITNESSING OF A TEST IS SPECIFICALLY WAIVED BY THE GOVERNMENT, PERFORM ALL TESTS WITH A GOVERNMENT WITNESS. If testing reveals deficiencies in the system, correct the deficiency and retest until successful.

3.14.3 Control System Cybersecurity Testing Report

Prepare and submit a Control System Cybersecurity Testing Report documenting all tests performed and their results. Include all tests in the Control System Cybersecurity Testing Procedures and any additional tests performed during testing. Document test failures and repairs conducted with the test results. The Control System Cybersecurity Testing Report may be submitted as a Technical Data Package

3.15 FIELD QUALITY CONTROL, CYBERSECURITY VALIDATION SUPPORT

In addition to testing and testing support required by other Sections, provide a minimum of 16 hours of technical support for cybersecurity testing of control systems to support the DoD Risk Management Framework process Cybersecurity assessment of the control system. This support is independent of (and in addition to) the Control System Cybersecurity Testing specified in this section.

3.16 CYBERSECURITY TRAINING

Provide eight hours of classroom and hands-on training for six Government personnel on the cybersecurity operation and maintenance of the control system provided. This training is in addition to and must be coordinated with control system training specified in other Sections.

The Government will provide the training location. Training must cover, at a minimum: (a) applying software and firmware updates, (b) user account creation, modification and deletion, (c) audit log upload procedures and (d) identification of privileged user interfaces and system impact of those interfaces. Training session must include a question and answer period during which government staff questions about cybersecurity aspects of the control system are answered.

-- End of Section --

SECTION 27 10 00

BUILDING TELECOMMUNICATIONS CABLING SYSTEM
05/25

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 D709	(2017) Standard Specification for Laminated Thermosetting Materials

BICSI International Standards Program (BICSI)

ANSI/BICSI N1	(2019) Installation Practices for Telecommunications and ICT Cabling and Related Cabling Infrastructure
ANSI/BICSI N3	(2020) Planning and Installation Methods for the Bonding and Grounding of Telecommunication and ICT Systems and Infrastructure
BICSI TDMM	(2024; 15th Edition) Telecommunications Distribution Methods Manual

ELECTRONIC COMPONENTS INDUSTRY ASSOCIATION (ECIA)

ECIA EIA/ECA 310-E	(2005) Cabinets, Racks, Panels, and Associated Equipment

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 100	(2000; Archived) The Authoritative Dictionary of IEEE Standards Terms

INSULATED CABLE ENGINEERS ASSOCIATION (ICEA)

ICEA 61196-1-100	(2022) Coaxial Communications Cables-Part 1-100:Electrical test methods General Requirements
ICEA S-83-596	(2021) Indoor Optical Cable
ICEA S-90-661	(2021) Category 3 and 5E Individually Unshielded Twisted Pairs, Indoor Cables (With or Without an Overall Shield) for Use in General Purpose and LAN Communications Wiring Systems

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO/IEC 11801	(2017) Information technology - Part 1-General Requirements-Generic cabling for customer premises
ISO/IEC 14763-2	(2019) Information technology - Part 1 -Implementation and operation of customer premises cabling
ISO/IEC 14763-3	(2024) Information technology - Implementation and operation of customer premises cabling; Part 3: Testing of optical fibre cabling

INTERNATIONAL TELECOMMUNICATION UNION (ITU)

ITU-T G.652	(2024) Characteristics of a single-mode optical fibre and cable
ITU-T G.655	(2009) Characteristics of a non-zero dispersion-shifted single-mode optical fibre and cable
ITU-T G.657	(2024) Characteristics of a bending-loss insensitive single-mode optical fibre and cable
ITU-T G.984.1	(2012) Gigabit-capable passive optical networks (GPON): General characteristics
ITU-T G.987.1	(2016; 2020 Corrigendum 1) 10-Gigabit-capable passive optical networks (XG-PON): General requirements

NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION (NECA)

NECA/BICSI 568	(2006) Standard for Installing Building Telecommunications Cabling

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

ANSI/NEMA WC 66	(2024) Standard for Category 6 and 6A, 100 Ohm, Individually Unshielded Twisted Pairs, Indoor Cables (With Or Without An Overall Shield) for Use in LAN Communication Wiring Systems
NEMA BI-50026/VE 2	(2024) Cable Tray Installation Guidelines

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2023; ERTA 1 2024; TIA 24-1; TIA 25-2) National Electrical Code

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)

ANSI/TIA-526-7	(2015a; R 2022) Measurement of Optical Power Loss of Installed Single-Mode Fiber

	Cable Plant, Adoption of IEC 61280-4-2 edition 2: Fibre-Optic Communications Subsystem Test Procedures - Part 4-2: Installed Cable Plant - Single-Mode Attenuation and Optical Return Loss Measurement
ANSI/TIA-526-14	(2023d) OFSTP-14A Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant
ANSI/TIA-568 Series	(2023) Building Telecommunications Cabling Standards, includes ANSI/TIA-568.0 (2020e), ANSI/TIA-568.1 (2024e), ANSI/TIA-568.2 (2024e), ANSI/TIA-568.3 (2022e), ANSI/TIA-568.4 (2022), ANSI/TIA-568.5 (2022)
ANSI/TIA-568.1	(2020e) Commercial Building Telecommunications Infrastructure Standard
ANSI/TIA-568.2	(2024e) Balanced Twisted-Pair Telecommunications Cabling and Components Standards
ANSI/TIA-568.3	(2022e) Optical Fiber Cabling Components Standard
ANSI/TIA-568.4	(2022e) Broadband Coaxial Cabling and Components Standard
ANSI/TIA-568.5	(2022; 2024 Am 1) Balanced Single Twisted-pair Telecommunications Cabling and Components Standard
ANSI/TIA-569	(2019e; Add 1 2022) Telecommunications Pathways and Spaces
ANSI/TIA-570	(2024e) Residential Telecommunications Infrastructure Standard
ANSI/TIA-606	(2021d) Administration Standard for Telecommunications Infrastructure
ANSI/TIA-607	(2019d) Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises
ANSI/TIA-1152	(2016; R 2021) Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling
TIA TSB-162	(2021) Telecommunications Cabling Guidelines for Wireless Access Points
TIA-455-21	(1988a; R 2012) FOTP-21 - Mating Durability of Fiber Optic Interconnecting Devices

TIA/EIA-598	(2014D; Add 2 2018) Optical Fiber Cable Color Coding
TIA/EIA-604-10	(2021c) FOCIS 10 Fiber Optic Connector Intermateability Standard - Type LC

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 3-580-01	(2024) Information and Communications Technology Infrastructure Planning and Design

U.S. FEDERAL COMMUNICATIONS COMMISSION (FCC)

FCC Part 68	Connection of Terminal Equipment to the Telephone Network (47 CFR 68)

UL SOLUTIONS (UL)

UL 50	(2024) UL Standard for Safety Enclosures for Electrical Equipment, Non-Environmental Considerations
UL 444	(2023) UL Standard for Safety Communications Cables
UL 467	(2022) UL Standard for Safety Grounding and Bonding Equipment
UL 486A-486B	(2025) UL Standard for Safety Wire Connectors
UL 514C	(2014; Reprint Apr 2024) UL Standard for Safety Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL 723	(2018; Reprint Jun 2025) UL Standard for Safety Test for Surface Burning Characteristics of Building Materials
UL 969	(2017; Reprint May 2023) UL Standard for Safety Marking and Labeling Systems
UL 1286	(2022; Reprint Mar 2024) UL Standard for Safety Office Furnishings
UL 1666	(2007; Reprint Sep 2021) UL Standard for Safety Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts
UL 1863	(2004; Reprint Apr 2025) UL Standard for Safety Communication Circuit Accessories
UL 2043	(2023) Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces

1.2 RELATED REQUIREMENTS

Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM and Section 33 82 00 TELECOMMUNICATIONS OUTSIDE PLANT (OSP), and Section 27 05 26 GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS 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 must be as defined in ANSI/TIA-568.1, ANSI/TIA-568.2, ANSI/TIA-568.3, ANSI/TIA-569, ANSI/TIA-606, Federal Communications Commission (FCC), BICSI TDMM, IEEE 100, and herein.

1.3.1 Distributor C / Campus Distributor (CD)

A distributor from which the campus backbone cabling emanates. (International expression for main cross-connect (MC).)

1.3.2 Distributor B / 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).)

1.3.3 Distributor A / Floor Distributor (FD)

A distributor used to connect horizontal cable and cabling subsystems or equipment. (International expression for horizontal cross-connect (HC).)

1.3.4 Telecommunications Room (TR)

An enclosed space for housing telecommunications equipment, cable, terminations, and cross-connects. The room is the recognized cross-connect between the backbone cable and the horizontal cabling.

1.3.5 Entrance Facility (EF)

An entrance to the building for both private and public network service cables (including wireless) including the entrance point at the building wall and continuing to the equipment room.

1.3.6 Equipment Room (ER)

An 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. It is not necessary for the TR or ER to be positively charged relative to air flow unless it is adjacent to an outside space, storage, warehouse, or an unconditioned space such as a mechanical room.

1.3.7 Open Cable

Cabling that is not run in a raceway as defined by NFPA 70. This refers to cabling that is "open" to the space in which the cable has been installed and is therefore exposed to the environmental conditions associated with that space.

1.3.8 Open Office

A floor space division provided by furniture, moveable partitions, or other means instead of by building walls.

1.3.9 Pathway

A physical infrastructure utilized for the placement and routing of telecommunications cable.

1.3.10 Telecommunications Cable

All copper and fiber cables utilized for the application of transmitting data on a network.Supports all equipment outlets whether indicated as work areas, service, or equipment type.

1.3.11 Activity Specific Telecommunications Manager/Authority

Throughout this document, the term "telecommunications manager" or "technical authority" refers to the following:

For Army, the Network Enterprise Center (NEC)

For Navy, the Base Communications Officer (BCO)

For Marine Corps, the Installation Communications G6

For Air Force, the Base/Installation

Communications Squadron, Commander's

Representative.

1.4 SYSTEM DESCRIPTION

Provide telecommunications pathway systems referenced herein. The telecommunications designer and contractor must coordinate with the technical authority concerning access to and configuration of telecommunications spaces. The building telecommunications cabling, and pathway system must include permanently installed backbone and horizontal cabling, horizontal and backbone pathways, service entrance facilities, work area pathways, telecommunications and service outlet assemblies, conduit, raceway, and hardware for splicing, terminating, and interconnecting cabling necessary to transport the Information Technology (IT) and Operational Technology (OT) (including LAN) between equipment items in a building. The horizontal system must be wired in a star topology from the telecommunications work area to the floor distributor or campus distributor at the center or hub of the star. The backbone cabling and pathway system includes intrabuilding and interbuilding interconnecting cabling, pathway, and terminal hardware.

The intrabuilding backbone provides connectivity from the floor distributors to the building distributors or to the campus distributor and from the building distributors to the campus distributor as required. The backbone system must be wired in a star topology with the campus distributor at the center or hub of the star. The interbuilding backbone system provides connectivity between the campus distributors and is specified in Section 33 82 00 TELECOMMUNICATIONS OUTSIDE PLANT (OSP).

1.5 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submittals must include the manufacturer's name, trade name, place of manufacture, and catalog model or number. Include performance and characteristic curves. Submittals must also include applicable federal, military, industry, and technical society publication references. Should manufacturer's data require supplemental information for clarification, the supplemental information must be submitted as specified in paragraph REGULATORY REQUIREMENTS. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

T1-T6 Telecommunications Drawings; G

SD-03 Product Data

Telecommunications Cabling (Backbone and Horizontal); G

Cable Trays; G

Non-continuous Cable Supports; G

Patch Panels; G

Telecommunications Outlet/Connector Assemblies; G

Equipment Support Frames; G

Connector Blocks; G

Floor Outlet And Poke-Thru Boxes; G

Plywood Backboards; G

SD-05 Design Data

Fiber Link Loss Budget; G

SD-06 Test Reports

Telecommunications Cabling Testing; G

SD-07 Certificates

Telecommunications Contractor Qualifications; G

Key Personnel Qualifications; G

Manufacturer Qualifications; G

Test Plan; G

Factory Reel Tests; G

SD-10 Operation and Maintenance Data

Telecommunications Cabling and Pathway System Data Package 5; G

SD-11 Closeout Submittals

Record Documentation; G

1.6 QUALITY ASSURANCE

1.6.1 Shop Drawings

In exception to Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES, submitted plan drawings must be in electronic format, both native and PDF. 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 must identify circuit terminals and indicate the internal wiring for each item of equipment and the interconnection between each item of equipment. Drawings must indicate required clearance for operation, maintenance, and replacement of operating equipment devices. Submittals must include the nameplate data, size, and capacity. Submittals must also include applicable federal, military, industry, and technical society publication references.

1.6.1.1 T1-T6 Telecommunications Drawings

Provide Registered Communications Distribution Designer (RCDD) approved drawings in accordance with ANSI/TIA-606. The identifier for each cabinet, rack, termination, and cable must appear on the drawings. Drawings must depict final telecommunications installed wiring system infrastructure in accordance with ANSI/TIA-606. The drawings should provide details required to prove that the distribution system will properly support connectivity from the EF telecommunications rooms and ER telecommunications rooms, Campus Distributor's (CD), Building Distributor's (BD) and Floor Distributor's (FD) to the telecommunications work area outlets.

Provide a plastic laminated schematic of the as-installed telecommunications cable system showing cabling, CD's, BD's, FD's, and the EF and ER for telecommunications keyed to floor plans by architectural wayfinding room number. Mount the laminated schematic in the EF telecommunications space as directed by the Contracting Officer. The following drawings must be provided as a minimum:

a. T1 - Building Area/Serving Zone Boundaries, Backbone Systems, and Horizontal Pathways. Layout of complete building per floor. The drawing indicates location of building areas, serving zones, vertical backbone diagrams, telecommunications rooms, access points, pathways, grounding system, and other systems that need to be viewed from the complete building perspective.

b. T2 - Serving Zones/Building Area Drawings - Drop Locations and Cable Identification (ID'S). Shows a building area or serving zone. These drawings show drop locations, telecommunications rooms, access points and detail call outs for common equipment rooms and other congested areas.

c. T3 - Drawings in accordance with ANSI/TIA-606 that include telecommunications rooms plan views, pathway layout (cable tray,

ladder racks, and conduit), mechanical/electrical layout, and cabinet, rack, backboard, and wall elevations. Drawings must show layout of applicable equipment including incoming cable stub or connector blocks, building protector assembly, outgoing cable connector blocks, patch panels and equipment spaces and cabinet/racks. Drawings must include a complete list of equipment and material, equipment rack details, to include conduit and cable tray fill data, 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 and T2 drawings.

d. T4 - Drawings to include Faceplate Labeling, Firestopping Assemblies, Americans with Disabilities Act (ADA) requirements, etc. Detailed drawings of symbols and typical details such as faceplate labeling, faceplate types, faceplate population installation procedures, detail racking, and raceways. Outlets must be laid out in a logical manner, moving left to right starting from the telecommunications space served.

e. T5 - Drawings to include schedules to show information for cutovers and administrative details.

f. T6 – Drawings to include network, riser, and boundary diagrams.

1.6.2 Telecommunications Qualifications

Work and equipment installation under this section must be performed by and provided by approved telecommunications contractor(s) and key personnel. Qualifications must be provided for: the telecommunications system contractor, the telecommunications system installer, and the supervisor (if different from the installer). A minimum of 30 days prior to installation, submit documentation of the experience, and certifications, of the telecommunications contractor and all key personnel.

1.6.2.1 Telecommunications Contractor

The telecommunications contractors must be a firm which is regularly and professionally engaged in the business of the implementation, installation, and testing of the specified telecommunications systems and equipment. The telecommunications contractor must demonstrate experience in providing successful telecommunications systems within the past 3 years of similar scope and size. Submit documentation for a minimum of three and a maximum of five successful telecommunication system installations for the telecommunications contractor.

1.6.2.2 Key Personnel

Provide key personnel who are regularly and professionally engaged in the business of providing implementation, 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 must demonstrate experience in providing successful telecommunications systems within the past 5 years. Submit documentation for a minimum of three and a maximum of five successful telecommunication system installations for the submitted key personnel. Supervisors, installers, and testers assigned to the installation of this system or any of its components must be Building Industry Consulting Services International (BICSI) Registered Cabling Installers, Technician Level for

both copper and fiber. Submit documentation of current BICSI certification for each of the key personnel. In lieu of BICSI certification, supervisors and installers assigned to the installation and testing of this system or any of its components must have a minimum of 5 years' experience in the installation of the specified copper and fiber optic cable and components and training that is deemed equivalent by the COR. These must include factory or factory approved certification from each equipment manufacturer indicating that they are qualified to install and test the provided products. Documentation for each key person must 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 systems and provide the names and locations of at least two project installations successfully completed using optical fiber and copper telecommunications cabling systems.

All the existing telecommunications system installations offered by the key persons as successful experience must 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. Note that only the key personnel identified in the approved submittals of the successful proposal, and approved by the Contracting Officer are permitted to do work on this solicitation's telecommunications system. Key personnel must 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 the resubmission of the qualifications and new approval from The Contracting Officers Representative (COR).

1.6.2.3 Minimum Manufacturer Qualifications

Cabling, equipment, and hardware manufacturers must have a minimum of 3 years' experience in the manufacturing, assembly, and factory testing of components which comply with ANSI/TIA-568 Series.

1.6.3 Test Plan

Provide a complete and detailed test plan for the telecommunications cabling system including a complete list of test equipment for the components and accessories for each cable type specified, 60 days prior to the proposed test date. Include procedures for certification, validation, fiber link loss budget and testing. Provide calibration data for equipment and all appurtenances and accessories to be used including but not limited to launch cables.

1.6.4 Test Reports

Provide test reports, in native and PDF format, for each copper and fiber cable installed. In addition to cable test data, each report must indicate the project name, date and time of test, personnel performing the test, software version of cable limits and equipment, and calibration dates of all equipment. Results must include equipment reference testing

required when changing equipment locations, when reference cords are removed from equipment, and the start of new testing shifts. Cable ID's on each test result must match those provided in T4 approved submittals.

1.6.5 Regulatory Requirements

In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "must" or "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 must be in accordance with the mandatory and advisory provisions of NFPA 70 unless more stringent requirements are specified or indicated.

1.6.6 Standard Products

Provide materials and equipment that are products of manufacturers regularly engaged in the production of such products which are of equal material, design, and workmanship. Products must have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year period must include applications of equipment and materials under similar circumstances and of similar size. The product must have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2-year period. Where two or more items of the same class of equipment are required, these items must 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.

1.6.6.1 Alternative Qualifications

Products having less than a 2-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturers' factory or laboratory tests, is furnished.

1.6.6.2 Material and Equipment Manufacturing Date

Products manufactured more than 1-year prior to date of delivery to site must not be used, unless specified otherwise. Products must not be delivered to site earlier than 6 months prior to installation.

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. Visual inspection, for damage, of all material must be performed prior to installation.

1.8 ENVIRONMENTAL REQUIREMENTS

Telecommunication spaces must comply with UFC 3-580-01 paragraph 2-3.1.3.3 and as indicated in Division 23 specifications. Connecting hardware must be rated for operation under ambient conditions of 32 to 140 degrees F and in the range of 0 to 95 percent relative humidity, noncondensing unless more stringent criteria are called out by the designer.

1.9 WARRANTY

The equipment items must 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 and as required in Section 01 78 00 CLOSEOUT SUBMITTALS.

1.10 SEISMIC REQUIREMENTS

Provide seismic details conforming to Section 13 48 73 SEISMIC CONTROL FOR NONSTRUCTURAL COMPONENTS and to Section 26 05 48 SEISMIC PROTECTION FOR ELECTRICAL EQUIPMENT as indicated.

1.11 MAINTENANCE

1.11.1 Operation and Maintenance Manuals

Commercial off the shelf manuals must be furnished for operation, installation, configuration, and maintenance of products provided as a part of the Telecommunications Cabling and Pathway System, Data Package 5. Submit draft operations and maintenance data, drawings, and record documentation prior to the start of final acceptance testing and commissioning. Submit final operations and maintenance data in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA and as specified herein not later than 2 months prior to the date of beneficial occupancy. In addition to requirements of Data Package 5, include the requirements of paragraphs TELECOMMUNICATIONS DRAWINGS, TELECOMMUNICATIONS SPACE DRAWINGS, and RECORD DOCUMENTATION. Ensure that these drawings and documents depict the as-built configuration.

1.11.2 Record Documentation

Provide T5 drawings including documentation on cables and termination hardware in accordance with ANSI/TIA-606. T5 drawings must include schedules to show information for cut-overs and cable plant management, patch panel layouts and cover plate assignments, cross-connect information, and connecting terminal layout as a minimum. T5 drawings must be provided on electronic media using Windows based computer cable management software. A licensed copy of the cable management software including documentation, must be provided. Provide the following T5 drawing documentation as a minimum:

a. Cables - A record of installed cable must be provided in accordance with ANSI/TIA-606. The cable records must include 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 in accordance with ANSI/TIA-606. Include manufacture date of cable with submittal.

b. Termination Hardware - A record of installed patch panels, cross-connect points, distribution frames, terminating block arrangements and type, and outlets must be provided in accordance with ANSI/TIA-606. Documentation must include the required data fields only in accordance with ANSI/TIA-606.

PART 2 PRODUCTS

2.1 COMPONENTS

Components must be UL, or third party certified by a nationally recognized testing laboratory (NRTL). Where equipment or materials are specified to conform to industry and technical society reference standards of the organizations, submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance. 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 must 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. Provide a complete system of telecommunications cabling and pathway components using star topology for the intra building backbone and the horizontal cabling. When redundancy is required by the mission utilize appropriate level of redundancy to ensure reliability. Provide support structures and pathways, complete with outlets, cables, connecting hardware and telecommunications cabinets/racks.

Cabling and interconnecting hardware and components for telecommunications systems must be UL listed, or third-party independent testing laboratory certified and must comply with NFPA 70, ANSI/TIA-569, and conform to the requirements specified herein.

2.2 TELECOMMUNICATIONS SPACES

Provide connecting hardware and termination equipment in the telecommunications entrance facility and telecommunication equipment rooms to facilitate installation as shown on design drawings for terminating and cross-connecting permanent cabling. Provide telecommunications interconnecting hardware color coding in accordance with ANSI/TIA-606 and as approved by the technical authority.

2.2.1 Plywood Backboards

Provide void-free, fire retardant treated A/C interior grade plywood. Plywood must comply with International Building Code, Section 2303.2 and painted only if required for illumination reflectance or by the Technical Authority. 3/4 in thick 4 by 8 ft. Backboards must be fire rated by manufacturing process. Fire stamp must be clearly visible. Paint applied over fire retardant backboard must be UL 723 fire retardant paint. Provide label including paint manufacturer, date painted, UL listing and name of installer. When painted, paint label and fire stamp must be clearly visible and outside of where equipment is likely to be installed. Backboards must be provided on a minimum of two adjacent walls in the telecommunication spaces or on walls indicated to support wall mounted equipment.

2.2.2 Equipment Support Frames

Provide in accordance with ECIA EIA/ECA 310-E and UL 50.

a. Racks, floor mounted 2-post modular type,42U 16-gauge steel or 11-gauge aluminum construction, minimum, treated to resist corrosion. Provide rack with vertical and horizontal cable management and horizontal ground bar. Provide 1 vertical surge protected Power Distribution Units (PDU) per rack with 42U, duplex 24 C13's and 18

flexible C39's, which accepts C14 and C20 plugs power receptacles. PDU must have indicator lights, but no integral on/off switch and be capable of monitoring. Rack must be compatible with 19 in panel mounting.

b. Cabinets, freestanding modular type, 16-gauge steel or 11-gauge aluminum construction , minimum, treated to resist corrosion and painted white. Cabinets with 63 percent mesh doors with blanks and baffling to ensure front-to-rear air flow and avoid intra-cabinet air circulation unless another cooling method is designed. In instances where other air flow is needed, use manufacturer-approved penetrations and sealing to maintain airflow. For hot and cold aisles, use an airflow scheme engineered for the solution. Cabinet must have removable and lockable side panels, front and rear doors with at least 63 percent mesh, and have adjustable feet for leveling. Cabinet must have cable access in the roof and base and be compatible with 19 in panel mounting. Provide cabinet with horizontal grounding bar, rack, roof mounted 550 CFM fan with filter and two vertical rear mounted surge protected Power Distribution Units with duplex 24 C13's and 18 flexible C39's, which accepts C14 and C20 plugs. All cabinets must be keyed alike to local activity key requirement unless in an entrance facility for Service Providers or as required for differing security levels.

2.2.3 Connector Blocks

Provide insulation displacement connector (IDC) Style 110 for Category systems aligned with cable type. Provide blocks for the number of horizontal and backbone cables terminated on the block plus 25 percent spare.

2.2.4 Cable Guides

Provide cable guides specifically manufactured for the purpose of routing cables, wires, and patch cords horizontally and vertically on 19 in equipment racks and telecommunications backboards. Provide Cable guides of ring or bracket type devices panels for horizontal cable management and individually mounted for vertical cable management. Mount cable guides with screws, and or nuts and lock washers. Provide one horizontal cable manager for every 48 port appearances below and above each patch panel unless angled patch panels are specified.

2.2.5 Patch Panels

Provide ports for the number of horizontal and backbone cables terminated on the panel plus 25 percent spare. Provide pre-connectorized optical fiber and copper patch cords for patch panels equal to the number of installed horizontal cables. Provide patch cords, as complete assemblies, with matching connectors as specified. Provide fiber optic patch cables with crossover orientation in accordance with ANSI/TIA-568.3. Patch cords must meet minimum performance requirements specified in ANSI/TIA-568 Series for cables, cable length, and hardware specified.

2.2.5.1 Connector Block to Patch Panel

Provide in accordance with ANSI/TIA-568 Series, ANSI/TIA-569 standards. Panels must be third party verified. Panel must be constructed of 0.09 in minimum aluminum and must be rack mounted and compatible with an ECIA EIA/ECA 310-E 19 in equipment rack. Panel must provide 48, Flat,

non-keyed, 8p8c wired to T568A. Patch panels must terminate the building cabling on RJ45 type connector and must utilize a printed circuit board interface. The rear of each panel must have incoming cable strain-relief and routing guides. Panels must have each port factory numbered.

2.2.5.2 Fiber Optic Backbone Patch Panel

Provide housing for maintenance and cross-connecting of optical fiber cables. Panel must be constructed of 16 gauge steel or 11-gauge aluminum minimum and must be rack mounted and compatible with an ECIA EIA/ECA 310-E 19 in equipment rack. Each panel must provide 12 single-mode adapters as MPT-type 12 fiber connector cassettes broke out to six duplex LC UPC connectors, duplex LC UPC in accordance with TIA/EIA-604-10 with zirconia ceramic alignment sleeves, duplex LC APC for RF applications including but not limited to DAS in accordance with TIA/EIA-604-10 with zirconia ceramic alignment sleeves. Provide dust cover for all unused adapters. The rear of each panel must have a cable management tray a minimum of 8 in deep with removable cover, incoming cable strain-relief and routing guides, and able to support 3 ft of cable slack. Panels must have each adapter factory numbered and be equipped with laminated plastic nameplates above each adapter. Must be equipped with factory bonding terminal. Patch panels must be sized to support all known connections plus 25 percent spare.

2.2.5.3 Fiber Optic Distribution Patch Panel

Rack mounted optical fiber distribution panel (OFDP) must be constructed in accordance with ECIA EIA/ECA 310-E utilizing 16 gauge steel or 11-gauge aluminum minimum. Panel must be divided into two sections, distribution and user. Distribution section must have strain relief, routing guides, splice tray and must be lockable, user section must have a cover for patch cord protection MPT-type 12 fiber connector cassettes multiplexed out to six duplex LC UPC connectors, duplex LC UPC in accordance with TIA/EIA-604-10 with zirconia ceramic alignment sleeves. Provide dust covers for adapters. Provide patch cords as specified in the paragraph PATCH PANELS.

2.3 TELECOMMUNICATIONS PATHWAY

Provide telecommunications pathways in accordance with ANSI/TIA-569, conduit types specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM, and as specified here. Provide system furniture pathways in accordance with UL 1286.

Provide the following: Submit cable trays design, including dimensional layout, load and seismic calculations, and fill calculations. Dimensional layout includes cable spacings, cable tray splices, and supports. Fill calculations include an index of cables for each section and identification of the lb/ft, cross sectional area, and insulation voltage class for each cable.

a. Cable trays: form a wireway system, with a nominal 4 in as indicated depth. Cable tray is to have a span/load class designation per NEMA BI-50026/VE 2.

b. Cable trays: constructed of aluminum or steel that has been hot-dipped galvanized after fabrication.

c. Cable trays: include splice and end plates, dropouts, and

miscellaneous hardware.

d. Edges, fittings, and hardware: finished free from burrs and sharp edges.

e. Fittings: ensure not less than load-carrying ability of straight tray sections and have manufacturer's minimum standard radius.

f. Radius of bends: as indicated.

g. Accessories: ensure cable transitions required to proper support cable, bonding hardware, are indicated and provided.

2.3.1 Basket-Type Cable Trays

Provide size as indicated of nominal 12 and 24 in width and 4 in depth with maximum wire mesh spacing of 2 by 4 in.

2.3.2 Ladder-Type Cable Trays

Provide size as indicated of nominal 12 in width with maximum rung spacing of 6 in in each EF and TR. Cable tray must be suitable for use as an equipment grounding conductor.

2.3.3 Non-continuous Cable Supports

Provide cable supports in accordance with UL 2043. Provide galvanized zinc-coated cable supports as indicated. Use cable trays for horizontal distribution to the maximum extent possible (maximum horizontal distance: 20 ft in open face hangers). The remaining pathway to the work area outlet may be implemented in a variety of ways combining conduit, non-continuous cable supports, and stub-ups/outs.

2.3.4 Sleeves and Conduit

Provide sleeves and conduit in accordance with Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM and as further required in ANSI/TIA-569. Conduit must be minimum 1 in, runs must not exceed 100 ft without installation of appropriate type, and sized pull box. There must be no aggregated bends between pull boxes in excess of 180 degrees. Pull boxes must not be installed as a change in pathway direction.

2.3.5 Floor Outlet and Poke-Thru Boxes

Telecommunications floor outlets: consisting of recessed outlets flush with the finished floor aluminum housing with receptacles as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM as indicated and a minimum of 2 1 in bushed side opening. Must be hinged type, not requiring a special took to open, and provides latching style ports for cable egress protection when in use.

2.3.6 Outlet Boxes for Telecommunications System

Provide the following:

a. Standard type 4 11/16 in square by 2 1/8 in deep.

2.4 TELECOMMUNICATIONS CABLING (BACKBONE AND HORIZONTAL)

Cabling must be UL listed for the application and must comply with ANSI/TIA-568 Series Standards ISO/IEC 11801 and NFPA 70. Provide a labeling system for cabling as required by ANSI/TIA-606, and UL 969. Ship cable on reels or in boxes bearing manufacture date for balanced twisted pair (BTP) in accordance with ICEA S-90-661 and optical fiber cables in accordance with ICEA S-83-596 coax in accordance with ICEA 61196-1-100 for all cable used on this project. Cabling manufactured more than 12 months prior to date of installation must not be used.

2.4.1 Backbone Cabling

2.4.1.1 Backbone Copper

Copper backbone cable must be solid conductor, 24 AWG, 100 ohm, 25-pair, Category 5e, UTP or greater, in accordance with ANSI/TIA-568.1, ANSI/TIA-568.2, and UL 444, formed into 25 pair binder groups covered with a gray thermoplastic jacket. Cable must be imprinted with manufacturers name or identifier, flammability rating, gauge of conductor, transmission performance rating (category designation) at regular length marking intervals in accordance with ICEA S-90-661. Provide plenum (CMP), riser (CMR), or general purpose (CM or CMG) communications rated cabling in accordance with NFPA 70. Substitution of a higher rated cable must be permitted in accordance with NFPA 70.

2.4.1.2 Backbone Optical Fiber

Provide in accordance with ICEA S-83-596, ITU-T G.655, ANSI/TIA-568.3, UL 1666, and NFPA 70. Cable must be imprinted with fiber count, fiber type and aggregate length at regular intervals not to exceed 40 in. Provide the number of strands indicated, (but not less than 12 strands between the main telecommunication room and each of the other telecommunication rooms), of single-mode (OS1a), tight buffered fiber optic cable. Specify For premises applications deploying 10 Gigabit-Passive Optical Network (10G-PON)ITU-T G.987.1, ITU-T G.984.1, and ITU-T G.657. For longer reaches directly mating to OSP specify bend-insensitive fiber meeting ITU-T G.652.

2.4.2 Horizontal Cabling

Provide horizontal cable in compliance with NFPA 70 and performance characteristics and installation in accordance with ANSI/TIA-568 Series applicable for the type of horizontal media.

2.4.2.1 Horizontal Copper

Provide horizontal copper cable, UTP, 100-ohm in accordance with ANSI/TIA-568.2, UL 444, ANSI/NEMA WC 66. For Workstation Outlets provide four each individually twisted pair, minimum size 24 AWG conductors, Category 6A, with a blue thermoplastic jacket.

For Service Outlets and Facility Related Control Systems (FRCS) that do not require 10G horizontal capability, provide four each individually twisted pair, minimum size 24 AWG conductors, Category 6, with a green thermoplastic jacket. For AV that contain uncompressed HDMI signals, provide four each individually twisted pair, minimum size 24 AWG conductors, Shielded Category 6A, with a White thermoplastic jacket. For Wireless Access Points (WAP) provide 2 Category 6a cables to each outlet

in accordance with TIA TSB-162. Cable must be imprinted with manufacturers name or identifier, flammability rating, gauge of conductor, transmission performance rating (category designation) and length marking at regular intervals in accordance with ICEA S-90-661. Provide plenum (CMP), riser (CMR), or general purpose (CM or CMG) communications rated cabling in accordance with NFPA 70. Substitution of a higher rated cable must be permitted in accordance with NFPA 70. Cables installed in conduit within and under slabs must be UL listed and labeled for wet locations in accordance with NFPA 70.

2.4.2.2 Horizontal Optical Fiber

Provide optical fiber horizontal cable in accordance with ANSI/TIA-568.3. Cable must be tight buffered, single-mode, 8/125-µm diameter, OS1a with ITU-T G.657 fiber. Cable must be imprinted with manufacturer, flammability rating and fiber count at regular intervals not to exceed 40 in. SMF cable shall be indoor/ outdoor damp location rated fiber where it passes through conduit or a vault or a handhole in contact with earth.

Provide plenum (OFNP), riser (OFNR), or general purpose (OFN or OFNG) rated non-conductive, fiber optic cable in accordance with NFPA 70. Substitution of a higher rated cable must be permitted in accordance with NFPA 70. Cables installed in conduit within and under slabs be UL listed and labeled for wet locations in accordance with NFPA 70. The cable jacket must be of single jacket construction with color coding of cordage jacket, fiber, unit, and group in accordance with TIA/EIA-598.

2.4.3 Work Area Cabling

2.4.3.1 Work Area Copper

Provide work area copper cable in accordance with ANSI/TIA-568.2, with a blue thermoplastic jacket.

2.4.3.2 Work Area Optical Fiber

Provide optical work area cable in accordance with ANSI/TIA-568.3.

2.4.3.3 Service Outlets

Provide service outlet 4-pair copper cabling to support all operational technology (OT) outlets as indicated in accordance with ANSI/TIA-568 Series.

2.5 TELECOMMUNICATIONS OUTLET/CONNECTOR ASSEMBLIES

2.5.1 Outlet/Connector Copper

Outlet/connectors must comply with FCC Part 68, ANSI/TIA-568.1, and ANSI/TIA-568.2 ANSI/TIA-568.5. UTP outlet/connectors must be UL 1863 listed, non-keyed, 8-pin modular, constructed of high impact rated thermoplastic housing and must be third party verified by a nationally recognized testing laboratory. Outlet/connectors provided for UTP cabling must meet or exceed the requirements for the cable provided. Outlet/connectors must be terminated using a RJ45 type connections, color-coded for both T568A and T568B wiring. Each outlet/connector must be wired T568A. UTP outlet/connectors must comply with ANSI/TIA-568.2 for 200 mating cycles. UTP outlet/connectors installed in outdoor or marine environments must be jell-filled type containing an anti-corrosive, memory retaining compound.

2.5.2 Optical Fiber Adapters(Couplers)

Provide optical fiber adapters suitable for duplex LC in accordance with TIA/EIA-604-10 with zirconia ceramic alignment sleeves. Provide dust cover for adapters. Optical fiber adapters must comply with TIA-455-21 for 500 mating cycles.

2.5.3 Optical Fiber Connectors

Provide in accordance with TIA-455-21. Optical fiber connectors must be duplex LC in accordance with TIA/EIA-604-10 with zirconia ceramic alignment sleeves, 8/125 singlemode fiber. The connectors must provide a maximum attenuation of 0.3 dB at 850, 1300, 1310 nm with less than a 0.2 dB change after 500 mating cycles.

2.5.4 Cover Plates

Telecommunications cover plates must comply with UL 514C, and ANSI/TIA-568 Series; flat design constructed of stainless steel 302 stainless material. Provide 2-Post, stainless material cover plates for all wall mounted telephone locations. Provide labeling in accordance with the paragraph LABELING in this section.

2.6 BONDING PRODUCTS

Provide in accordance with UL 467, ANSI/TIA-607, and NFPA 70. Components must be labeled as required by ANSI/TIA-606 and as indicated.

2.6.1 Bonding Conductors

ASTM B1, solid bare copper wire for sizes No. 8 AWG and smaller diameter; ASTM B8, Class B, stranded bare copper wire for sizes No. 6 AWG and larger diameter. Conductors must be installed using two-hole compression type lugs in accordance with ANSI/TIA-607 and UL 486A-486B.

Provide a copper TBB between the telecommunications main grounding busbar (PBB) and the electrical service ground in accordance with ANSI/TIA-607. Size the bonding conductor for telecommunications the same as the TBB. Provide insulated TBB with insulation as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM paragraph INSULATION and meeting the fire ratings of its pathway.

2.6.1.1 Telecommunications Bonding Backbone (TBC)

Provide a copper Telecommunication Bonding Conductor (TBC) between the primary bonding busbar (PBB) and the electrical service ground in accordance with ANSI/TIA-607. Size the TBC the same as the largest TBB conductor. Provide insulated TBCB with insulation as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM paragraph INSULATION and meeting the fire ratings of its pathway.

2.6.1.2 Telecommunications Bonding Backbone (TBB)

Provide a copper telecommunications bonding backbone (TBB) between the PBB and all SBB's in accordance with ANSI/TIA-607. Size the TBB in accordance with ANSI/TIA-607 based on total length.

2.6.1.3 Telecommunications Backbone Bonding Conductor (BBC)

Provide a copper telecommunications backbone bonding conductor(BBC) between the top most floor SBB's in accordance with ANSI/TIA-607. Size the BBC the same as the largest TBB conductor. Provide insulated conductors with insulation as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM paragraph INSULATION and meeting the fire ratings of its pathway.

2.6.1.4 Telecommunications Equipment Bonding Conductor (TEBC)

Provide a copper conductor in accordance with ANSI/TIA-607 with a minimum No. 6 AWG to bond all raceways, rack RBB, cabinet RBB to the PBB and/or SBB. Provide insulated conductors with insulation as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM paragraph INSULATION and meeting the fire ratings of its pathway.

2.6.2 Bonding Busbars

Provide corrosion-resistant bonding busbar suitable for indoor installation in accordance with ANSI/TIA-607. Busbars: plated for reduced contact resistance. Provide a Primary bonding busbar (PBB) in the telecommunications entrance facility and a Secondary bonding busbar (SBB) in all other telecommunications rooms and equipment rooms. The Primary bonding busbar (PBB) and the secondary bonding busbar (SBB): sized in accordance with the immediate application requirements and with consideration of future growth. Provide horizontal Rack Bonding Busbar (RBB) in each rack, cabinet. Provide bonding busbars with the following: a. , b. ; c. Listed by a nationally recognized testing laboratory.

a. Predrilled copper busbar provided with holes for use with standard sized two-hole lugs,

b. Minimum dimensions of 0.25 in thick by 4 in wide for the PBB and 2 in wide for SBBs with length 24" as indicated and 0.25 in thick by 19 in for a horizontal RBB.

c. Listed by a nationally recognized testing laboratory.

2.7 FIRESTOPPING MATERIAL

Provide as specified in Section 07 84 00 FIRESTOPPING. Ends of conduit stubs must be treated as part of the overall assembly.

2.8 MANUFACTURER'S NAMEPLATE

Each item of equipment must have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

2.9 UNIQUE IDENTIFICATION NAMEPLATES AND LABELS

Provide laminated plastic nameplates per ASTM D709 thermal ink transfer process laser printer for each equipment rack, cabinet patch panels, outlet and active equipment device; as specified or as indicated on the drawings. Nameplates must be melamine plastic, 0.125 in thick, white with black center core. Surface must be matte finish. Corners must be square. Accurately align lettering and engrave into the core. Minimum size of

nameplates must be 1 by 2.5 in. Lettering must be a minimum of0.25 in high normal block style sized for the equipment, white with black text. Labels must be sized to fit the devices/equipment being labeled.

2.10 TESTS, INSPECTIONS, AND VERIFICATIONS

2.10.1 Factory Reel Tests

Provide documentation of the testing and verification actions taken by manufacturer to confirm compliance with ANSI/TIA-568.2 for BTP copper ANSI/TIA-568.3 and ANSI/TIA-526-7 for single mode optical fiber, and ANSI/TIA-526-14 for multimode optical fiber cables.

PART 3 EXECUTION

3.1 INSTALLATION

Install telecommunications telecommunication spaces, pathway systems, and cabling (including the horizontal and backbone cable), telecommunications outlet/connector assemblies, and associated hardware as detailed in NECA/BICSI 568, ANSI/BICSI N1, ANSI/BICSI N3, ANSI/TIA-568.1, ANSI/TIA-568.2, ANSI/TIA-568.3, ANSI/TIA-569, NFPA 70, and UL standards as applicable. Pathways and outlet boxes must be types as specified in PART 2. Install cabling in a star topology network. Install telecommunications cabling with copper media in accordance with the following criteria to avoid potential electromagnetic interference between power and telecommunications equipment. The interference ceiling must not exceed 3.0 volts per meter measured over the usable bandwidth of the telecommunications cabling. Cabling must be run with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment. To ensure a logical sequence of installation, and ease of maintenance, organize cables from top-to-bottom, left-to-right across the front of each patch panel. WAO must start from the building's main entrance serving telecommunications room working left-to-right around each room and left-to-right throughout the building.

3.2 TELECOMMUNICATION SPACE EQUIPMENT

Install all termination hardware necessary to support required Category 6a and optical fiber systems and network equipment as indicated on the drawings.

3.2.1 Plywood Backboards

Install A/C grade plywood backboards on walls as indicated on the drawings and in accordance with ANSI/TIA-569. Mount plywood vertically, with the bottom of the plywood 6 in above the finished floor with the best side toward the room. Mounting anchors utilizing galvanized zinc plated hardware with a flat head. Finished installation must be flush with countersunk screw head to prevent splitting. Drywall screws are not acceptable.

3.2.2 Equipment Support Frames

Install equipment support frames, patch panels, cable management, and cable guides in accordance with ANSI/TIA-569. Verify coordinated placement of all equipment and utilities. Maintain required clearances per PART 2 and approved shop drawing. Mount required PDU's along the sides of equipment frames per manufacturers recommendation.

a. Bracket, wall mounted. Mount bracket to plywood backboard in accordance with manufacturer's recommendations. Mount rack so height of highest panel does not exceed 78 in above floor.

b. Racks, floor mounted modular type. Permanently anchor rack to the floor in accordance with manufacturer's recommendations. Anchor at the top in accordance with seismic requirement found elsewhere in design.

c. Cabinets, freestanding modular type. When cabinets are connected, remove adjoining side panels for cable routing between cabinets. Mount rack mounted fan in roof of cabinet.

d. Allow a minimum of 36 in working clearance in front and rear of floor mounted equipment frames. Clearance of 6 in is required for equipment frames adjacent to a wall and a minimum of 30 in is required at the end of each row.

3.2.3 Connector Blocks

Install wall mounted 110-Type connector blocks in orderly rows and columns. Adequate vertical and horizontal wire routing areas must be provided between groups of blocks. Install in accordance with industry standard wire routing guides per ANSI/TIA-569.

3.2.4 Patch Panels

Patch panels must be mounted in equipment cabinets, racks with sufficient ports to accommodate the installed cable plant plus 25 percent spares.

a. Copper Patch Panel. Copper cable entering a patch panel must have additional support and be secured to the panel as recommended by the manufacturer to prevent movement of the cable and reduce component strain. Land cabling left-to-right, top-to-bottom in the same logic as room's are identified.

b. Fiber Optic Patch Panel. Fiber optic cable loop must be 3 ft in length. The outer jacket of each cable entering a patch panel must be secured to the panel to prevent movement of the fibers within the panel, using clamps or brackets specifically manufactured for that purpose.

3.2.5 Cable Management

Install horizontal and vertical cable management in accordance with ANSI/TIA-569.

a. Horizontal Cable Management: Install one rack unit (RU) horizontal manager for every one RU of patch panel or switch port appearances. Horizontal cable management must be installed to support ports without overlapping/crossing/impinging on other port appearances.

Vertical Cable Management: Install vertical cable management between racks and at each end of each row. Vertical cable management panels must be a minimum of 6 in wide and deep and additionally sized based on total anticipated cable fill plus 50 percent. Allow space against wall for operation of management covers.

3.3 TELECOMMUNICATIONS PATHWAYS

Install in accordance with ANSI/TIA-569 and NFPA 70.

a. Horizontal Pathway: Telecommunications pathways from the work area to the telecommunications room: installed and cabling length requirements in accordance with ANSI/TIA-568 Series. Size conduits wireways and cable trays in accordance with ANSI/TIA-569 and as indicated. Install a minimum of 1 in conduit for telecommunications work area and service outlets. Conduit size must be increased if required by cable diameter and fill requirements.

b. Backbone Pathway: Telecommunication pathways from the telecommunications entrance facility to telecommunications rooms, and, telecommunications equipment rooms (backbone cabling): installed in accordance with ANSI/TIA-569 and as indicated. Size conduits, wireways, and cable trays for telecommunications risers in accordance with ANSI/TIA-569 and as indicated.

c. Service Entrance Conduit, Overhead: Install service entrance overhead as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM.

3.3.1 Interior Distribution System

Install conduit in accordance with Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM PART 3 except as indicated below. Install wall mounted outlet boxes as specified in PART 2. Provide pull boxes for telecommunications systems in accordance with ANSI/TIA-569. No conduit runs must exceed 100 ft without a pull boxed placed. Pull boxes must not be used for a change in direction. Conduit bends must not exceed more than the equivalent of two 90 degree bends or 180 degrees total without the addition of a pull box in accordance with ANSI/TIA-569. Conduits must enter and exit pull boxes in accordance with ANSI/TIA-569. Install firestop penetrations in accordance with Section 07 84 00 FIRESTOPPING. Install conductors run through smoke and fire partitions in 4 in rigid steel conduits with bond bushings, extending 12 in beyond each side of partitions. Seal conduit on both ends to maintain smoke and fire ratings of partitions listed fire barrier pathways.

3.3.2 Pull Cords

Pull cords must be installed in conduit serving telecommunications outlets that do not have cable installed. Pull cords must be labeled on each end and indicate the service in which they were installed to support, the location of all pull boxes, and room number of the far ends. Spare outlet locations must be included in record documentation.

3.3.3 Cable Tray

Install cable tray as specified in PART 2. Cable tray access and working clearances of 12 in on one side and above the tray must be coordinated with other utilities. Side and top encroachment distance of less than 3 ft in a 20 ft span is allowable provided it does not prohibit access to raceways or conduits that feed into the tray and is approved prior to cable installation. These encroachments must be approved by the Building Information Modeling (BIM) Coordination Team with final approval by the Information Communications Technical Authority. Install cable tray using wall mounted brackets ceiling hung brackets. Do not install cable tray using a single center hanger.

Install and bond in accordance with NFPA 70, ANSI/TIA-569, and ANSI/TIA-607. Install cable trays parallel with or at right angles to ceilings, walls, and structural members. Cable tray and tray supports must not partially nor completely obstruct access to the room. Support in accordance with NEMA BI-50026/VE 2 and with manufacturer recommendations but at not more than 6 ft intervals as indicated by the manufacturer. Coat contact surfaces of aluminum connections with an antioxidant compound prior to assembly. Adjacent cable tray sections bonded together by connector plates of an identical type as the cable tray sections. Terminate cable trays 10 in from both sides of smoke and fire partitions. Install cable tray supports to resist forces of 0.5 times the equipment weight in any direction and 1.5 times the equipment weight in the downward direction. Ensure edges, fittings, and hardware are finished free from burrs and sharp edges.

3.3.4 Non-Continuous Cable Supports

Install open top and closed ring cable supports on 4 ft to 5 ft centers to adequately support and distribute the cable's weight. Use these types of supports to support a maximum of 20 0.25 indiameter cables. Support cable not in a wireway or pathway minimum of 8 in above ceilings and no greater than 4 ft to 5 ft centers to adequately support and distribute the cable's weight. Open top and closed ring cable supports must be suspended from or attached to the structural ceiling or walls with hardware or other installation aids specifically designed to support their weight.

Cable must not be run through structural members or in contact with pipes, ducts, or other potentially damaging items. Placement of cable parallel to power conductors must have a minimum separation of 12 in. Cable routed exposed under raised floors must be plenum rated. Plenum cables must comply with flammability plenum requirements of NFPA 70. Install cabling after the flooring system has been installed in raised floor areas and arranged to not impede underfloor airflow.

3.3.5 Floor Outlet and Poke-Thru Boxes

Install floor outlet boxes in accordance with manufacturer's instructions and as indicated. Boxes must be flush with finished floor surfaces. If electrical power is provided in the same box, the box must be fully partitioned.

3.3.6 Telecommunication Penetrations

Seal openings around telecommunication penetrations through fire resistance-rated wall, partitions, floors, or ceilings as specified in Section 07 84 00 FIRESTOPPING.

3.4 TELECOMMUNICATIONS CABLE

3.4.1 Backbone Cable

a. Copper Backbone Cable. Install intrabuilding backbone copper cable, in indicated pathways, between the campus distributor, located in the telecommunications entrance facility or room, the building distributors and the floor distributors located in telecommunications rooms and telecommunications equipment rooms as indicated on drawings.

b. Optical fiber Backbone Cable. Install intrabuilding backbone optical

fiber in indicated pathways. Prepare cable for pulling by cutting outer jacket 10 in leaving strength members exposed for approximately 10 in. Twist strength members together and attach to pulling eye. Vertical cable support intervals must be in accordance with manufacturer's recommendations. Fusion-splice backbone fibers to factory produced pigtails.

3.4.2 Horizontal Cable

Install UTP and optical fiber telecommunications cabling system as detailed in ANSI/TIA-568 Series based on media type. Screw terminals must not be used except where specifically indicated on plans. Use an approved insulation displacement connection (IDC) tool kit for copper cable terminations. Terminate on a workstation outlet, service outlet, or MPTL on the field end and a patch panel in the TR. Do not exceed manufacturers' cable pull tensions for copper and optical fiber cables. Provide a device to monitor cable pull tensions. Do not exceed 25 lbs pull tension for four pair copper cables. Do not chafe or damage outer jacket materials. Use only lubricants approved by cable manufacturer. Do not use any support methods that allow over cinching of cables, or crush cables with staples. For UTP cable, bend radii must not be less than four times the cable diameter. For fiber optic cables the bend radius must not be less than 20 times the diameter during pulling and must not be less than 10 times the diameter after installation. All cabling must be terminated; no cable must contain unterminated elements. Cables must not be spliced. Label cabling in accordance with paragraph LABELING in this section. Install cable rated for their listed environment.

a. Install copper horizontal cabling as indicated on approved shop drawings. Do not untwist Category UTP cables more than 1/2 in from the point of termination to maintain cable geometry. Install a slack cable a minimum of 10 ft along the longest pathway in the TR. Install 12 in of cable slack above ceiling at the WOA or service outlet.

b. Install fiber horizontal cabling as indicated on approved shop drawings. Install a slack loop a minimum of 10 ft in the form of a managed figure-eight (not a service loop) on the back wall field of the telecommunications room. Install fiber optic cable in innerduct.

3.5 OUTLETS

3.5.1 Work Area Outlets

Terminate copper work area outlet cable in accordance with ANSI/TIA-568.1, ANSI/TIA-568.2, ANSI/TIA-568.4, ANSI/TIA-568.5 and wiring configuration T568A. Terminate fiber optic cables in accordance with ANSI/TIA-568.3.

3.5.2 Service Outlets (SO)

Terminate copper cable in accordance with ANSI/TIA-568.1, ANSI/TIA-568.2, ANSI/TIA-568.4, ANSI/TIA-568.5, TIA TSB-162 and wiring configuration as specified. Terminate fiber optic cables in accordance with ANSI/TIA-568.3. Male (MPTL) may be used in place of a SO in applications where a SO and patch cord are not accessible, or the OT equipment is not conducive to this type of installation.

3.5.3 Cover Plates

As a minimum, each outlet/connector must be labeled with the unique number

to identify cable link in accordance with the paragraph LABELING in this section and as shown on the approved shop drawings.

3.6 TELECOMMUNICATIONS BONDING

Clean the busbar prior to fastening the conductors to the busbar and apply an anti-oxidant to the contact area to control corrosion and reduce contact resistance. No. 2 AWG bare copper wire throughout cable tray system, and bond to each section, except use No. 1/0 aluminum wire if cable tray is aluminum. Provide cable tray connecting hardware listed for bonding per the manufacture literature and from the same manufacturer. Provide in accordance with ANSI/TIA-607, NFPA 70 and as specified in Section 27 05 26 GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS.

3.6.1 Telecommunications Bonding Busbars

Install a Primary bonding busbar (PBB) in the telecommunications entrance facility in accordance with ANSI/TIA-607. Install the PBB as close to the electrical service entrance grounding connection as practicable. Where a panelboard for telecommunications equipment is not installed in the entrance facility room, locate the PBB near the backbone cabling and associated terminations. In addition, locate the PBB to provide for the shortest and straightest routing of the grounding conductors. Where a panelboard for telecommunications equipment is located within the same room or space as a PBB, bond that panelboard's alternating current equipment ground (ACEG) bus (when equipped) or the panelboard enclosure to the PBB. Bond the PBB to building steel using irreversible exothermic weld 2 lugs connect rated for bonding. Install a Secondary bonding busbar (SBB) in all other telecommunications rooms and telecommunications equipment rooms. Install the SBB as close to the telecommunications room panelboard as practicable, when equipped. Where a panelboard for telecommunications equipment is not installed in the telecommunications room, locate the SBB near the backbone cabling and associated terminations. In addition, locate the SBB to provide for the shortest and straightest routing of the grounding conductors. Where a panelboard for telecommunications equipment is located within the same room or space as a SBB, bond that panelboard's alternating current equipment ground (ACEG) bus (when equipped) or the panelboard enclosure to the SBB. Install bonding busbars to maintain clearances as required by NFPA 70 and insulated from its support. A minimum of 2 in separation from the wall is recommended to allow access to the rear of the busbar and adjust the mounting height to accommodate overhead or underfloor cable routing.

3.6.2 Telecommunications Bonding Conductors (TBC)

Install a TBC service equipment bond consisting of separate bonding conductor between the PBB and readily accessible grounding connection of the electrical service in accordance with ANSI/TIA-607. Bonding conductors should not be placed in ferrous metallic conduit unless required per NFPA 70 for protection from physical and mechanical damage. If it is necessary to place grounding and bonding conductors in ferrous metallic conduit that exceeds 3 ft in length, bond the conductors to each end of the conduit using a grounding bushing and No. 6 AWG conductor, minimum.

3.6.3 Backbone Bonding Conductor (BBC)

Install a BBC between the topmost SBB's that extends across the building, using the telecommunications backbone pathways shortest paths, and

connects to the SBBs in all telecommunications rooms and equipment rooms in accordance with ANSI/TIA-607. Each BBC must be continuous to the farthest SBB. Bonding conductors should not be placed in ferrous metallic conduit unless required per NFPA 70 for protection from physical and mechanical damage. If it is necessary to place grounding and bonding conductors in ferrous metallic conduit that exceeds 3 ft in length, bond the conductors to each end of the conduit using a grounding bushing and No. 6 AWG.

3.6.4 Telecommunications Bonding Backbone (TBB)

Install a TBB that originates at the PBB, extends throughout the building using the telecommunications backbone pathways shortest paths, and connects to the SBBs in all telecommunications rooms and equipment rooms in accordance with ANSI/TIA-607. Each TBB must be continuous to the farthest SBB. Bonding conductors should not be placed in ferrous metallic conduit unless required per NFPA 70 for protection from physical and mechanical damage. If it is necessary to place grounding and bonding conductors in ferrous metallic conduit that exceeds 3 ft in length, bond the conductors to each end of the conduit using a grounding bushing and No. 6 AWG conductor, minimum.

a. The TBC and TBB BBC conductor must be installed without splices and routed in the shortest possible straight-line path to the greatest extent possible. Make the bonding conductor between a TBB and SBB continuous. Where splices are unavoidable, the number of splices should be a minimum. Make the splices accessible and located in telecommunications spaces. Connect joined segments of a TBB using exothermic welding, irreversible compression-type connectors, or equivalent. Install all joints to be adequately supported and protected from damage. Whenever two or more TBBs are used within a multistory building, bond the TBBs together with a backbone bonding conductor (BBC) at the top floor and at a minimum of every third floor in between. Do not connect the TBB or BBC to the pathway ground.

b. Telecommunications Bonding Connections (TEBC): Telecommunications bonding connections to the PBB or SBB: utilize listed compression, two-hole lugs, exothermic welding, suitable and equivalent, or other irreversible compression type connections. Bond all metallic pathways, cabinets, and racks for telecommunications cabling and interconnecting hardware located within the same room or space as the PBB or SBB to the PBB or SBB respectively. In a metal frame (structural steel) building, where the steel framework is readily accessible within the room; bond each PBB and SBB to the vertical steel metal frame using a minimum No. 6 AWG conductor. Where the metal frame is external to the room and readily accessible, bond the metal frame to the SBB or PBB with a minimum No. 6 AWG conductor. When practicable because of shorter distances and, where horizontal steel members are permanently electrically bonded to vertical column members, the SBB may be bonded to these horizontal members in lieu of the vertical column members. All connectors used for bonding to the metal frame of a building must be listed for the intended purpose.

c. Rack Bonding Busbar (RBB): Install horizontal busbars in each equipment frame provided. Bond all appliances and supporting hardware that have a manufacturer bonding connection available. Unless otherwise approved by the Telecommunications Manager to not bond equipment frames using example "A" in ANSI/TIA-607. Utilize listed compression, two-hole lugs, suitable and equivalent one-hole

compression.

d. Telecommunications Equipment Frames and Supporting Structures; Bond all telecommunications equipment frames and supporting metallic structures (cable trays, ladder rack, conduits, bonding conductor of nonmetallic sheathed cables, foiled, or shielded cable) in accordance with ANSI/TIA-607 and NFPA 70. Utilize listed compression two-hole lugs, bonding ribbons, or other irreversible compression type connections. Where ground fault protection is employed, ensure that connection of ground and neutral does not interfere with correct operation of fault protection. Label all bonding conductors in accordance with ANSI/TIA-606, paragraph LABELING of this section, and as designed. Test all bonding in accordance with ANSI/TIA-607 and as provided in paragraph TESTING.

3.7 LABELING

3.7.1 Labels

Provide labeling in accordance with ANSI/TIA-606, UFC 3-580-01, and as submitted and approved on T4 shop drawings. Handwritten labeling is unacceptable. Stenciled lettering for voice and data circuits must be provided using thermal ink transfer process, laser printer. Labeling of cabling must be provided on all telecommunication outlet boxes.

3.7.2 Cable

Cables must be labeled using labels with To/From information on opposing end with identifiers in accordance with ANSI/TIA-606 and as submitted and approved on T4 shop drawings.

3.7.3 Termination Hardware

Equipment frames, workstation outlets, service outlets, and patch panel connections must be labeled using coded labels with identifiers in accordance with ANSI/TIA-606 and as submitted and approved on T4 shop drawings.

3.8 FIELD APPLIED PAINTING

Painting must be as specified in Section 09 90 00 PAINTS AND COATINGS.

3.8.1 Painting Backboards

If backboards are required to be painted, then the manufactured fire-retardant backboard must be painted with fire retardant paint, so as not to increase flame spread and smoke density and must be appropriately labeled. Label and fire rating stamp must be unpainted and placed in a location not anticipated to be covered by equipment.

3.9 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. Nameplates must be installed plumb, level, and center to the device.

3.10 TESTING AND INSPECTIONS

3.10.1 Telecommunications Cabling Testing

Perform telecommunications cabling inspection, verification, and performance tests in accordance with ANSI/TIA-568 Series, ISO/IEC 14763-2, ISO/IEC 14763-3 based on media. Test equipment must conform to ANSI/TIA-1152. Provide results with coordinated as built record plans for labeling in accordance with ANSI/TIA-606 and approved label scheme as a single complete package. Remove failed cable reels from project site upon attenuation test failure. Copper tests are required to be performed with Certification Test Equipment level IIIe at 500 MHz for class 6, 6A with the results furnished in the native format of the tester and in PDF format. For service outlets and other cables that are not workstation outlets use the most applicable test for the class of cable per ANSI/TIA-568 Series standard. To test links with an MPTL run the test Permanent Link Adapter and a Patch Cord Adapter (PCA) on the other end following manufacturer recommendations.

Level	Frequency	Cable Category
IIe	100 MHz	5e and class D
III	250 MHz	6 and class E
IIIe	500 MHz	6A and class EA
IV	1000 MHz	8 and class F/FA*

3.10.1.1 Inspection

Visually inspect UTP 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 T568A or T568B pin assignments and inspect cabling connections to confirm compliance with ANSI/TIA-568.1, ANSI/TIA-568.2, ANSI/TIA-568.3, ANSI/TIA-568.4, ANSI/TIA-568.5 and ANSI/TIA-570 for residential cabling. Visually confirm Category 6a marking of outlets, cover plates, outlet/connectors, and patch panels ensuring the entire channel is composed of components of the same marking. Visually inspect cabling jacket for deformation and discoloration. Cables may be required to be replaced, regardless of test results, if cabling jacket damage is deemed by the telecommunications manager or COR to be excessive.

3.10.1.2 Verification Tests

a. Technicians who have successfully completed a training program for the test equipment and hold a current certificate as proof thereof must execute the tests.

b. The COR must be notified of the start date of the testing phase 5 business days before testing commences and must be invited to witness andor review field-testing. Cable acceptance testing must only be performed after cabling is in place, both ends are terminated, and faceplates are installed.

c. Bonding system testing is required to determine if an acceptable level of resistance is provided between the telecommunications bonding

system and the building's electrical grounding electrode system. Prior to performing testing a visual inspection must be performed to verify all components are installed in accordance with ANSI/TIA-607 recommendations. Perform bonding testing on all segments of the bonding system using a two-point test in accordance with ANSI/TIA-607. Testing must be performed prior to the installation of any telecommunications equipment. Maximum value of resistance between any two points in the telecommunications bonding system and to the buildings electrical grounding electrode system must be less than 100 milliohms. Document and submit test results in accordance with paragraph SUBMITTALS.

d. UTP backbone copper cabling must 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 prior to being cross-connected.

For single-mode optical fiber, perform 100 percent of optical fiber end-to-end attenuation tests in accordance with ANSI/TIA-568.3 and ANSI/TIA-526-7 using Tier 1, Optical Power Meter and Light Source and Tier 2, OTDR for single-mode optical fiber. Test the link at both standard frequencies bidirectionally for single-mode. Reference grade connectors with an attenuation value equal to or less than 0.20dB for single-mode must be used. The testing method must comply with ANSI/TIA-526-7 using the single jumper method. Fiber connector loss must be .5dB or less and splice loss must be 0.3dB or less for cable acceptance.

An optical time domain reflectometer (OTDR) is required for all inside plant lengths more than 295 ft when requested by the Telecommunications Manager using the launch cables and exit cables of the required length for the fiber type. This does not relieve the requirement for the OLTS above.

Final labeling must be verified as part of testing and certified as accurate per record documentation.

3.10.1.3 Performance Tests

Perform testing for each outletas follows:

a. Perform 100 percent of Category 6a cables using link tests in accordance with ANSI/TIA-568.1 and ANSI/TIA-568.2, ANSI/TIA-568.5. Tests for pass/fail must include Wire Map, DC Loop Resistance, Length, Propagation Delay, Delay Skew, Insertion Loss, Return Loss, NEXT, ACR-F, PS ACR-F, PSNEXT, PSAACR-F, DC Resistance Unbalance, DC Resistance Unbalance between pairs.

   Testing of no less than 10 percent of cabling installed for Average PS ANEXT, PS AACR-F, Average PS AACR-F.

   Test reports must be recorded for information only for the following tests: ACR-N, PS ACR-N, TCL, and ELTCTL.

b. Optical fiber Links. Perform optical fiber end-to-end Tier 1, Tier 2, bidirectional, link tests in accordance with ANSI/TIA-568.3.

3.11 COMMISSIONING

Commissioning of the telecommunications system must be accomplished for projects where more than passive equipment is provided as further defined in Section 01 91 00.15 22 TOTAL BUILDING COMMISSIONING.

-- End of Section --

SECTION 27 41 00

AUDIO-VISUAL SYSTEMS
11/21

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.

AUDIOVISUAL AND INTEGRATED EXPERIENCE ASSOCIATION (AVIXA)

ANSI/INFOCOMM 2M	(2010) Standard Guide for Audiovisual Design and Coordination Processes
ANSI/INFOCOMM 10	(2013) Audiovisual Systems Performance Verification
ANSI/INFOCOMM A102.01	(2017) Audio Coverage Uniformity in Listener Areas
AVIXA F502.01	(2018) Rack Building for Audiovisual Systems
AVIXA F502.02	(2020) Rack Design for Audiovisual Systems
INFOCOMM F501.01	(2015) Cable Labeling for Audiovisual Systems

BICSI International Standards Program (BICSI)

ANSI/BICSI 001	(2017) Information and Communication Technology Systems Design and Implementation Best Practices for Educational Institutions and Facilities
ANSI/BICSI N1	(2019) Installation Practices for Telecommunications and ICT Cabling and Related Cabling Infrastructure
ANSI/BICSI N3	(2020) Planning and Installation Methods for the Bonding and Grounding of Telecommunication and ICT Systems and Infrastructure

ELECTRONIC COMPONENTS INDUSTRY ASSOCIATION (ECIA)

ECIA EIA/ECA 310-E	(2005) Cabinets, Racks, Panels, and Associated Equipment

EXTRON ELECTRONICS (EE)

EE GUI Design Guide	(2020; 4th Edition) Graphical User Interface Design Guide

MIDDLE ATLANTIC PRODUCTS (MA)

MA Whitepaper	(2018) Controlling the Temperature Inside Equipment Enclosures

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2023; ERTA 1 2024; TIA 24-1; TIA 25-2) National Electrical Code

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)

ANSI/TIA-568.1	(2020e) Commercial Building Telecommunications Infrastructure Standard
ANSI/TIA-568.2	(2024e) Balanced Twisted-Pair Telecommunications Cabling and Components Standards
ANSI/TIA-568.3	(2022e) Optical Fiber Cabling Components Standard
ANSI/TIA-568.4	(2022e) Broadband Coaxial Cabling and Components Standard
ANSI/TIA-569	(2019e; Add 1 2022) Telecommunications Pathways and Spaces
ANSI/TIA-606	(2021d) Administration Standard for Telecommunications Infrastructure
ANSI/TIA-607	(2019d) Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises
TIA-568.0	(2020e) Generic Telecommunications Cabling for Customer Premises

U.S. Code (USC)

19 USC 13	Trade Agreements Act of 1979
41 USC 83	Buy American Act

U.S. DEPARTMENT OF DEFENSE (DOD)

DODI 8100.04	(2010) DOD Unified Capabilities (UC)

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

36 CFR 1191	Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines

UL SOLUTIONS (UL)

UL 2043	(2023) Fire Test for Heat and Visible Smoke Release for Discrete Products and

	Their Accessories Installed in Air-Handling Spaces
UL 62368-1	(2019) UL Standard for Audio/Video, Information, and Communication Technology Equipment - Part 1: Safety Requirements

1.2 RELATED DOCUMENTS

a. Drawings and general provisions of the Contract including General and Supplementary Conditions and UFGS Division 01 Specification Sections.

b. UFGS Division 26 Specification for Communications cabling, cabling pathways, termination and physical mounting of cable hangers and cable trays.

c. UFGS Division 26 Specification Sections for room lighting fixtures, dimmers, power receptacle outlets, and interconnecting wiring for these circuits.

d. UFGS Division 27 Specification Sections for all telecommunications requirements - including LAN connections, analog and digital telephone lines, digital data circuits, high speed internet access and building horizontal cabling.

e. Section 27 05 13.43 TELEVISION DISTRIBUTION SYSTEM for CATV Systems.

f. Section 25 05 11 CYBERSECURITY FOR FACILITY-RELATED CONTROL SYSTEMS.

g. UFGS Division 23 Specification Sections for Heating, Ventilation and Air Conditioning.

h. Audiovisual drawings and equipment lists.

i. If system design services are required, provide designs in accordance with ANSI/INFOCOMM 2M and ANSI/BICSI 001.

1.3 SCOPE OF WORK

This Specification Section outlines the minimum requirements and installation methods for the integrated audiovisual System, hardware, software, cables, accessories, and acceptance testing. System refers to the complete and functional assemblage of equipment required to achieve the specified functionality, performance, and design intent. This includes but is not limited to:

a. Audio equipment: Speakers, mixers, amplifiers, microphones, signal processing equipment, and source equipment.

b. Video equipment: Displays, signal routing and processing equipment, and source equipment.

c. Remote control equipment including touch panels, control processors, software, and programming.

d. Equipment racks and associated hardware such as rack screws, power distribution products, cooling products, and blank panels.

e. Cables, snakes, connectors, plates, and wiring.

f. Other similar parts that may be required for normal operation such as projector bulbs and lenses.

g. Mounts, rigging, and required hardware such as all-thread, unistrut, chains, and cables.

h. Floor boxes

i. Display wall boxes

j. AV lecterns and credenzas

k. System commissioning

l. Training

m. Documentation

n. Communication and coordination with all team members and trades to fulfill the requirements of this Specification.

1.4 EXCLUDED SCOPE OF WORK

a. Cutting and patching

b. Painting, refinishing and finishes

c. Floor boxes

d. Display wall boxes

e. AV lecterns and credenzas

f. Work specified in other UFGS Specification Sections.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Qualifications; G

Bid Pricing; G

SD-02 Shop Drawings

Shop Drawings; G

SD-09 Manufacturer's Field Reports

Status Reports and Meeting Minutes; G

SD-10 Operation and Maintenance Data

Record Drawings; G

Operation and Maintenance (O&M) Manuals, G

1.6 CYBERSECURITY

Coordinate any network security requirements related to this Specification in accordance with Section 25 05 11 CYBERSECURITY FOR FACILITY-RELATED CONTROL SYSTEMS.

1.7 QUALIFICATIONS

1.7.1 General

a. Comply with all UFGS Division 1 (General Requirements) standards to include Section 01 14 00 WORK RESTRICTIONS.

b. The Government reserves the right to accept or reject the System Contractor or Manufacturer based upon qualifications and ability to conform to specified technical or licensing requirements of this Section. System Contractors, Installers and Manufacturers that do not have the specified qualifications will not be acceptable and will not be allowed to perform the work of this Section.

c. The Government will determine the acceptability of any proposed System Contractor, Installer and Manufacturer based on submitted and verified documentation that substantiates that the proposed System Contractor, Installer and Manufacturer have the qualifications specified in this Section.

d. Submit documented verification of the specified qualifications as part of the Data Qualifications submittal. The Government maintains the right to request, inspect and verify references and resumes of all technical and managerial personnel assigned to the project.

1.7.2 System Contractor Qualifications

The System Contractor must:

a. Be licensed in the project jurisdiction as required to perform the work included in this Specification.

b. Be regularly engaged in the system application design, documentation, installation, testing, training, and maintenance of the type of system specified in this Section.

c. Have a minimum of five years of experience providing these services for systems having the same level of features and functions as the system being provided.

d. Submit five references with contact names and valid telephone numbers regarding similar projects successfully completed within the last 3 years.

e. Be capable of providing manufacturer-specified installation, programming, training, maintenance, and repair for all equipment provided.

f. Have an office within a 120 mile radius of the project site that can provide all specified service and support.

g. Be responsible for any required low voltage permits.

h. Use a Project Manager with a CTS-D certification.

i. Use a Lead Installer with a CTS-D certification.

j. Use a Control System and Digital Signal Processor (DSP) Programmer certified by the manufacturer(s) of the product(s) used in the project.

k. Submit names and resumes of key personnel that will be assigned to the project. As a minimum, these personnel must include the Project Salesman, Project Manager, Lead Installer, Control System Programmer, and Digital Signal Processor Programmer. The same person may be utilized for multiple project responsibilities. Once approved, these personnel are expected to work on the project through the duration. Any replacement personnel must be approved by the Contracting Officer. The approved Lead Installer, Control System Programmer, and Digital Signal Processor Programmer must be present during system commissioning.

1.7.3 Manufacturer Qualifications

Each product manufacturer must:

a. Have a minimum of 5 years' experience in producing the products and type of system included in this Specification Section.

b. Guarantee the availability of the replacement parts for the designed system for a minimum of 3 years from the date of final acceptance of the system by the Contracting Officer.

1.8 BID PRICING

Submit the following in conjunction with the System Contractor Qualifications information:

a. Complete and accurate listing of all equipment to be used in assembling the system(s).

b. Itemized pricing for all equipment. Include sales tax where applicable.

c. Itemized costs for all pertinent labor/installation categories.

d. Itemized costs for any optional items such as Add/Deduct Alternates and Extended Warranties.

e. Any proposed Handing and Administration Rates (HAR) are not to exceed 5 percent. This fee will account for all administrative costs, overhead, bonding fees, administration of subcontracts, profit, and any other costs associated with and related to the coordination and processing of the procurement and installation of the equipment. The proposed HAR percentage will be incorporated into the contract award and will not be adjusted regardless of fluctuations from the estimate amount for the FF&E. The proposed HAR is a fixed rate.

1.9 SHOP DRAWINGS

Submit the following prior to the purchase, assembly, or installation of any equipment:

a. Drawing Index and Title Page.

b. Symbols Legend showing all devices, cable types, labelling scheme and any other information required to decipher symbols in the submittal package.

c. Floor Plans, Reflected Ceiling Plans, and Sectional View drawings as required to completely document all devices, dimensional locations, and infrastructure requirements.

d. System wiring diagrams showing make and model of equipment, logical wire traces, cable types, and any other identifying labels for wiring or ancillary devices.

e. Rack Elevations showing rack identifiers, equipment location within each rack, per-outlet power distribution details, and any rack accessories.

f. Plate and Panel drawings showing connections, size, finish, color, engraving, and any other information required to document fit and finish of wall plates or floor boxes.

g. Riser drawings showing cable routing between wall plates, floor boxes, ceiling devices, racks, and any other devices as required.

h. Additional drawings as required -including but not limited to custom furniture and millwork, custom display details and equipment mounting.

i. Patch Panel and/or Network Switch Layouts that show port numbering schemes and IP information as required.

j. Product data sheets for equipment and cabling, organized logically by system type and indexed for reference. Any parts used but not approved may be rejected at any time.

k. Material samples as required.

l. Project schedule including key milestones including but not limited to submittal packages, material procurement, rack fabrication and shop testing, installation milestones as applicable, acceptance testing, and completion.

1.10 STATUS REPORTS AND MEETING MINUTES

a. Provide weekly status reports outlining progress on the project to the Contracting Officer. These reports must include information on the work completed during the week, the work to be completed during the upcoming week and any potential scheduling issues.

b. Provide minutes for any meetings directly related to this project. Minutes are to be completed within one week of the meeting.

1.11 DELIVERY, STORAGE, AND HANDLING

a. All costs for shipping to the site, and of any unusual storage requirements, are to be a part of this Specification.

b. Make appropriate arrangements, and coordinate with authorized personnel at the site, for the proper acceptance, handling, protection, and storage of equipment so delivered.

c. Until site conditions are ready for installation of the AV equipment, some AV equipment must be received and stored offsite in suitable environmental conditions for sensitive electronic equipment. This equipment must be made available to the Government for inspection as required.

PART 2 PRODUCTS

2.1 GENERAL

a. All materials must be new, free from defects and not less than the quality specified. Materials must be designed to ensure satisfactory operation and operational life in the environmental conditions which will prevail where they are being installed.

b. At the time of submittal, supply the latest model for each piece of equipment.

c. All products used must be manufactured no more than one year prior to installation.

d. All products must be provided with the latest version of all software/firmware.

e. All equipment must be UL 62368-1 or equivalent listed or industry standard and comply with the NEC NFPA 70.

f. Equipment installed in air handling spaces must be UL 2043 listed

g. Where indicated as relevant to this project, all equipment must be 19 USC 13 compliant, 41 USC 83 compliant, and approved prior to purchase.

h. Where indicated as relevant to this project, all equipment must be DISA compliant and on the DODI 8100.04 DoDIN Approved Products List.

i. No Substitutions or Variances are allowed without the written consent of the Contracting Officer or their approved representative.

j. Substitute equipment must meet or exceed the performance specifications of the basis of design equipment and be at no additional cost.

k. Substitute equipment must not impact the existing architectural, mechanical or electrical designs.

l. Submit equipment pricing based on the specified equipment herein. Any substitute equipment or new proposed equipment necessary to fulfill the design intent, must be clearly categorized and priced individually on a separate page as an alternate to the specified equipment.

Pricing for the original specified equipment must still be provided.

2.2 SYSTEM DESCRIPTION

2.2.1 B550 Room

These systems will support the command and all associated teams in a forward-thinking, effective, and efficient manner. This will be achieved through the deployment of technology that meets-and where possible, exceeds-current mission requirements. The technology will follow the local, Navy and/or other specified codes and standards for low and high-side signal transportation. This, for example, will include the use of devices designed and manufactured to be Trade Agreements Act (TAA) compliant.

2.2.1.1 Administrative Private Offices

The rooms will be equipped with a single UHD 4K flat-panel display mounted on the wall using a low-profile mount with pull-out and tilt functionality. The mount will be installed over a recessed display backbox containing surge protection and a quad electrical outlet. Mounted behind the monitor there will be a TAA-compliant digital signage decoder to enable network-based content playback and distribution to the room displays as part of the facility's enterprise signage and information system.

2.2.1.2 Administrative Office

The rooms will be equipped with a single UHD 4K flat-panel display mounted on the wall using a low-profile mount with pull-out and tilt functionality. The mount will be installed over a recessed display backbox containing surge protection and a quad electrical outlet. Mounted behind the monitor there will be a TAA-compliant digital signage decoder to enable network-based content playback and distribution to the room displays as part of the facility's enterprise signage and information system.

2.2.1.3 Building Manager

The room will be equipped with a single UHD 4K flat-panel display mounted on the wall using a low-profile mount with pull-out and tilt functionality. The mount will be installed over a recessed display backbox containing surge protection and a quad electrical outlet. Mounted behind the monitor there will be a TAA-compliant digital signage decoder to enable network-based content playback and distribution to the room displays as part of the facility's enterprise signage and information system.

2.2.1.4 Maintenance Office

The room will be equipped with a single UHD 4K flat-panel display mounted on the wall using a low-profile mount with pull-out and tilt functionality. The mount will be installed over a recessed display backbox containing surge protection and a quad electrical outlet. Mounted behind the monitor there will be a TAA-compliant digital signage decoder to enable network-based content playback and distribution to the room displays as part of the facility's enterprise signage and information system.

2.2.1.5 Enlisted Private Office

The rooms will be equipped with a single UHD 4K flat-panel display mounted on the wall using a low-profile mount with pull-out and tilt functionality. The mount will be installed over a recessed display backbox containing surge protection and a quad electrical outlet. Mounted behind the monitor there will be a TAA-compliant digital signage decoder to enable network-based content playback and distribution to the room displays as part of the facility's enterprise signage and information system.

2.2.1.6 Training Room

The Training room will be equipped with dual large-format UHD 4K flat-panel displays mounted on the wall at the head of the table using low-profile mounts with pull-out and tilt functionality. The mounts will be installed over recessed display backboxes containing surge protection and quad electrical outlets. A unified communications (UC) all-in-one camera system with integrated speakers and microphone array will support Microsoft Teams conferencing. A graphics input and a small touch panel will be provided for room interaction and basic system control. A small removable Audio-Visual credenza with casters and provisions for heat dissipation will house the support equipment. Mounted behind each monitor there will be a TAA-compliant digital signage decoder to enable network-based content playback and distribution to the room displays as part of the facility's enterprise signage and information system.

2.2.1.7 Lobby

The rooms will be equipped with a single UHD 4K flat-panel display mounted on the wall using a low-profile mount with pull-out and tilt functionality. The mount will be installed over a recessed display backbox containing surge protection and a quad electrical outlet. Mounted behind the monitor there will be a TAA-compliant digital signage decoder to enable network-based content playback and distribution to the room displays as part of the facility's enterprise signage and information system.

2.2.1.8 Lounges

The Lounge rooms will be equipped with a large-format UHD 4K flat-panel display mounted on the wall at the head of the table using low-profile mounts with pull-out and tilt functionality. The mounts will be installed over recessed display backboxes containing surge protection and quad electrical outlets. A unified communications (UC) all-in-one camera system with integrated speakers and microphone array will support Microsoft Teams conferencing but should be confirmed. A graphics input and a small touch panel will be provided for room interaction and basic system control. A small removable Audio-Visual credenza with casters and provisions for heat dissipation will house the support equipment. Mounted behind each monitor there will be a TAA-compliant digital signage decoder to enable network-based content playback and distribution to the room displays as part of the facility's enterprise signage and information system.

2.2.1.9 AV Rooms

The intent of the AV Rooms is to support the equipment for each floor and surrounding rooms and infrastructure for a multi-building digital signage

system. A robust, centrally managed, TAA-compliant platform capable of delivering UHD content to designated displays with minimal local intervention. The system is designed to be flexible enough to accommodate future expansion and evolving content needs.

The facility will be provided with an enterprise digital signage system to support the distribution of informational, training, and administrative content to designated displays throughout the building. The system will be centrally managed, network-based, and scalable to support future expansion. Content will be distributed over a facility data network and displayed locally at each signage endpoint.

Digital signage playback at each display location will be supported by digital signage decoders. The decoders will be TAA-compliant and capable of supporting UHD 4K content output suitable for large-format flat-panel displays. Decoders will be installed locally at each designated signage display and will interface with the display via HDMI or equivalent digital video connection. Each decoder will support network-based content delivery, scheduled playback, and centralized management as part of the overall signage system architecture.

Where required, an infrared control interface will be provided to support local display power control and basic display functions. These interfaces will allow signage content playback to be coordinated with display operational states and support unattended operation.

A centralized digital signage server platform will be provided to support content management, scheduling, distribution, and system monitoring. The server will be implemented as a physical platform, subject to final design coordination and location with the facility IT and cybersecurity stakeholders.

Final server sizing, storage capacity, and licensing quantities will be confirmed during subsequent design phases based on the number of signage endpoints and content requirements.

Detailed network architecture and security implementation will be developed during the 60% and 90% design phases.

At the 35% design phase, the location and staffing model for digital signage system operation and content creation have not been defined. It is assumed that system operators and content designers may be located within an operations center, administrative workspace, or other Owner-designated area. Final requirements will be validated through coordination with the Owner and ICT team during the 60% and 90% design phases.

A unified communications (UC) all-in-one camera system with integrated speakers and microphone array that supports Microsoft Teams conference will need a GFE computer that is connected to the Government Training network.

PART 3 EXECUTION

3.1 EXAMINATION

After becoming familiar with the details of the work and working conditions, verify dimensions and equipment locations in the field, and advise the Contracting Officer of any discrepancies before performing the

work.

3.2 GENERAL INSTALLATION STANDARDS

a. Coordinate the installation of all equipment, wiring, and associated hardware to be compatible with the work of other trades and with the overall construction completion schedule. Coordinate all access and work with the Government in advance.

b. Protect all finishes, furniture, and equipment, and maintain a clean work environment while working and when finished each day.

c. Perform installation in strict accordance with AVIXA standards and best practices, general industry standards and best practices, the National Electrical Code, and any other governing codes.

d. Keep a complete and accurate set of installation drawings at the job site. Note any changes made during installation on the drawings. Include a final set of as-built drawings with the Operation and Maintenance manuals.

e. Install all equipment following the manufacturers' recommendations and broadcast standards. Adjust and test to assure that all components are functioning properly by themselves and in conjunction with their associated components.

f. Install all equipment in appropriate cabinets or consoles at the locations designated in this document or on the associated contract drawings.

g. Apply no advertising to racks, equipment, and accessories. Where possible, remove all visible manufacturer name badges from equipment mounted in public areas.

h. Cleanup and dispose of all waste materials daily. Wherever possible, materials must be properly recycled.

3.3 MOUNTING, RIGGING AND SEISMIC RESTRAINT

a. Design and build equipment racks in accordance with AVIXA F502.01, AVIXA F502.02, and ECIA EIA/ECA 310-E.

b. Mount equipment in accordance with 36 CFR 1191.

c. Securely fasten all equipment in place unless requirements of portability dictate otherwise. Fastenings and supports must be adequate to support their loads with a safety factor of at least five.

d. Provide seismic protection, including supports and hangers, as required by applicable code.

e. Install all boxes and equipment plumb and square per the manufacturer's recommended mounting practice.

f. Securely fasten and support all equipment without hindering equipment operation.

g. Provide shaft locks or security covers on all non-user-operated equipment having front panel controls.

h. Provide structural/rigging calculations for mounting equipment more than 500 pounds. Mounting details may require review and approval by the project's Structural Engineer.

i. Equipment racks will be designed to ensure proper thermal management. Maximum constant operating temperature of equipment should not exceed 85 degrees Fahrenheit. Where cooling fans are provided in racks located in sensitive areas, select fans to minimize the noise impact in the area. Refer to MA Whitepaper.

3.4 GROUNDING AND SHIELDING

a. Install grounding in accordance with NFPA 70, ANSI/TIA-607, ANSI/BICSI N3 and all Division 26 Specification Sections.

b. As a minimum, provide individual equipment racks with a rack grounding stud or bus bar and a #12 stranded (minimum) bonding jumper connected to the grounding and bonding stud on the primary power distribution unit that is plugged into the power receptacle serving the rack. Isolate the rack from the floor with plastic or rubber wheels/leveling feet.

c. Verify the integrity of grounding systems prior to connection of equipment.

3.5 GENERAL WIRING STANDARDS

a. Provide, install, terminate, and test all cabling in accordance with TIA-568.0, ANSI/TIA-568.1, ANSI/TIA-568.2, ANSI/TIA-568.3, ANSI/TIA-568.4, ANSI/TIA-569, ANSI/BICSI N1, AVIXA F502.01, AVIXA F502.02 and other industry best practices.

b. All wiring runs must be unspliced where possible. Splices are not permitted in conduit, outside of listed splice boxes.

c. Cable routed in conduits or equipment racks to have non-plenum (PVC) rated jacket. All other cables to have a plenum rated jacket.

d. Cables routed above ceilings must be suspended above the ceiling tiles in J-hooks or cable tray.

e. Provide outdoor-rated, direct burial, or other similar specialty rated cable types where required based on installation conditions and applicable codes.

f. The following denotes the most common cabling types and the minimum performance requirements. The Contractor is required to verify all cabling specifications based on the actual equipment provided.

(1) Microphone and Line Audio Cable:

(a) 22 AWG (7x30) stranded twisted shielded pair with overall shield

(b) Nominal Capacitance (Conductor to Conductor): less than or equal to 35 pF/ft

(c) Nominal Capacitance (Conductor to Conductor and Shield):

less than or equal to 67 pF/ft

(2) Low Impedance Loudspeaker Cable:

(a) 14 AWG (19x27) stranded twisted pair

(b) Nominal Capacitance (Conductor to Conductor): less than or equal to 36 pF/ft

(3) Low Impedance Loudspeaker Cable:

(a) 12 AWG (19x25) stranded twisted pair

(b) Nominal Capacitance (Conductor to Conductor): less than or equal to 36 pF/ft

(4) Low or High Impedance Loudspeaker Cable

(a) 16 AWG (19x29) stranded pair

(b) Nominal Capacitance (Conductor to Conductor): less than or equal to 36.5 pF/ft

(5) High Impedance Loudspeaker Cable (70V / 100V)

(a) 18 AWG (7x26) stranded pair

(b) Nominal Capacitance (Conductor to Conductor): less than or equal to 34 pF/ft

(6) Antenna Cables - RG58 - Wireless Microphone and Assisted Listening

(a) 50 ohm RG-58 19 AWG solid center conductor

(b) Nominal Capacitance (Conductor to Shield): less than or equal to 27 pF/ft

(c) Nominal Attenuation at 900MHz: less than or equal to 12.5 dB/100 ft

(7) Antenna Cables - RG213 - Wireless Microphone and Assisted Listening

(a) 50 ohm RG-213 13 AWG solid center conductor

(b) Nominal Capacitance (Conductor to Shield): less than or equal to 31 pF/ft

(c) Nominal Attenuation at 900MHz: less than or equal to 6.5 dB/100 ft

(8) Antenna Cables - RG8/U - Wireless Microphone and Assisted Listening

(a) 50 ohm RG-8/U 10 AWG solid center conductor

(b) Nominal Capacitance (Conductor to Shield): less than or equal to 25 pF/ft

(c) Nominal Attenuation at 900MHz: less than or equal to 4 dB/100 ft

(9) Video Tie Line Cable:

(a) RG59/U coaxial cable 20 AWG solid bare copper

(b) Nominal Capacitance (Conductor to Shield): less than or equal to 16.5 pF/ft

(c) Nominal Attenuation at 3000MHz: less than or equal to 22 dB/100 ft

(10) Video Tie Line Cable:

(a) RG6/U coaxial cable 18 AWG solid bare copper

(b) Nominal Capacitance (Conductor to Shield): less than or equal to 16.5 pF/ft

(c) Nominal Attenuation at 3000MHz: less than or equal to 18 dB/100 ft

(11) Video Tie Line Cable:

(a) RG11/U coaxial cable 14 AWG solid bare copper

(b) Nominal Capacitance (Conductor to Shield): less than or equal to 16.5 pF/ft

(c) Nominal Attenuation at 3000MHz: less than or equal to 10.5 dB/100 ft

(12) Video Tie Line Cable Five (5) Conductor - Mini High-Res:

(a) 5 x 26 AWG coaxial cable with overall jacket

(b) Nominal Capacitance (Conductor to Shield): less than or equal to 17 pF/ft

(c) Nominal Attenuation at 1000MHz: less than or equal to 21.5 dB/100 ft

(13) Video Tie Line Cable Five (5) Conductor - RG59:

(a) 5 x 24 AWG coaxial cable with overall jacket

(b) Nominal Capacitance (Conductor to Shield): less than or equal to 17.5 pF/ft

(c) Nominal Attenuation at 1000MHz: less than or equal to 13.5 dB/100 ft

(14) Digital Video SUTP Tie Line Cable

(a) 4 x 26 AWG solid bare copper, shielded twisted pair

(b) Nominal Capacitance (Conductor to Shield): less than or equal to 25 pF/ft

(c) Nominal Attenuation at 500MHz: less than or equal to 20.5 dB/100 ft

(15) Data Tie Line Cable:

(a) Refer to telecommunications specifications for project-standard data cabling information.

(16) RS-232 Control Cable

(a) 22 AWG (7X30) Two pair twisted, individually shielded with drain wire

(b) Nominal Capacitance (Conductor to Conductor): less than or equal to 17 pF/ft

(17) Specialty Control Cable - AXLINK, CRESNET:

(a) 22 AWG (7X30) shielded twisted pair with drain wire and 18 AWG unshielded pair in single jacket

(b) Nominal Capacitance (Conductor to Conductor): less than or equal to 14 pF/ft

(18) Multimode Optical Fiber:

(a) 50/125 micron as required per transmission equipment manufacturer recommendation. If transmission equipment does not support 50/125 micron, 62.5/125 micron shall be permitted.

(b) Strand count per functional drawings; minimum of two strands for each run outside the main equipment cabinet.

(c) Shall support 10Gbps transmission speed for length of run

(d) Each optical fiber strand shall be sufficiently free of surface imperfections and inclusions to meet the optical, mechanical, and environmental requirements of this specification and all ANSI/TIA-568.3 performance parameters.

(19) Single-Mode Optical Fiber:

(a) 8.3/125 micron

(b) Each optical fiber strand shall be sufficiently free of surface imperfections and inclusions to meet the optical, mechanical, and environmental requirements of this specification and all ANSI/TIA-568.3 performance parameters.

(20) Unshielded Ethernet:

(a) 4Px24 AWG UTP

(b) Cat6 with a minimum ANSI/TIA-568.2 standard rating

(21) Shielded Ethernet:

(a) 4Px24 AWG STP

(b) Cat6 with a minimum ANSI/TIA-568.2 standard rating

g. Use digital video cable as specified by the product manufacturer to obtain a signal at the maximum capable system resolution (minimum 1080P, 60Hz) that is free from all artifacts at each display from each source location. Use shielded cabling and connectors as required. Where multiple cabling options are provided by a manufacturer, use the option resulting in the greatest performance.

h. All Category cabling and connectors are to be rated at CAT6 or greater with a minimum ANSI/TIA-568.2 standard rating.

i. All Category cabling and connectors to be terminated to the T568A standard unless otherwise required.

j. Use color-coded ruggedized and lockable (Neutrik EtherCON or similar) shielded panel connectors and shielded inline connectors for all Contractor provided signal distribution equipment that requires RJ-45 style connectors at wall panel or floor box panel connections, except for those connecting a piece of AV equipment to the LAN. Maintain all cable shielding as required.

k. Each digital AV over RJ-45 receptacle, permanently installed cable, equipment cord, and patch panel will be of a color or have markings that are non-standard with the voice/data system, and be plainly and permanently labeled "AV Only".

l. Arrange, route, and isolate wiring according to signal level to minimize crosstalk, hum, or spurious signals. Wiring categories must consist of: microphone level (minus 80 dBm to minus 20 dBm), line level (minus 20 dBm to plus 30 dBm), loudspeaker level (plus 30 dBm and above), AC power, and DC control or emergency power.

m. Select cable color according to signal type. Submit color scheme to Contracting Officer for approval as a part of the Shop Drawing submission package.

n. Install all cabling in an orderly and professional manner. Provide service loops to allow access to the rear of equipment.

3.6 LABELING

a. Label all cables and equipment in accordance with ANSI/TIA-606 and INFOCOMM F501.01.

b. Use white labeling with black text unless requested otherwise by the Contracting Officer.

c. Provide the wire run list as an Excel spreadsheet and include as a part of the Operation and Maintenance Manuals.

d. Clearly and logically label external devices such as audio mixers, wireless microphones, belt packs, and assistive listening receivers.

e. Label relevant inputs and outputs on switchers, matrices, and mixers. This includes digital/virtual labelling of audio channels and video inputs and outputs.

f. Label telephone numbers, ISDN numbers and IP addresses of pertinent devices.

g. Label cabling wherever it is exposed in junction or pull boxes.

3.7 REMOTE CONTROL SYSTEM PROGRAMMING

a. Design graphical user interfaces in accordance with industry standards such as noted in EE GUI Design Guide.

b. As a minimum, the remote-control systems (where provided) will be programmed for the following general functionality as appropriate for each room:

(1) Power sequencer: Rack power on/off.

(2) Displays: Power on/off, input source select, video mute, lamp life monitoring. Automatic power on when a source is selected for display.

(3) Video matrices: Source routing.

(4) Video cameras: Pan/tilt/zoom, preset store and select.

(5) Media player: Standard transport and menu controls.

(6) Video codec: Dialing, privacy, volume up/down/mute, pick up/hang up, camera controls, menu navigation, source send select.

c. Where all room video sources are portable, use video sync sensing to automatically power on the room display system upon connection of a video source and automatically power off the display upon disconnection of a video source.

d. Provide separate Program and Microphone audio level controls with mute function. Include a technician's page with access to individual microphone level controls. Include a preset button to recall default levels.

e. UPS: System monitoring. Provide a technician page for the monitoring of the UPS. Feedback will be provided to monitor the following conditions as available by the UPS: Utility Voltage, Output Voltage, Current Load, Load Percentage, Wattage Load, Battery Capacity, Battery Voltage, Remaining Battery Time, Remaining Charging Time, and Cabinet Temperature. Provide alerts for the detection of any system faults, warnings, or abnormal conditions as available.

f. Lighting system: Preset 1-4 recall, all lights on, all lights off, individual lighting zone raise/lower, all lights raise/lower.

g. Room combining: In room combined mode, all video sources must be made available to all video destinations and all microphone sources must be made available to all audio destinations. The audio from the last routed video source is to become the local program audio source. One control system touch panel is to become the master (or multiple touch panels can track together). In rooms with operable partition sensors, use the sensors to automatically recall the room combination presets.

h. In the absence of pre-defined touch panel templates, propose draft touch panel pages for review and approval by the Government prior to programming. A minimum of one meeting must be provided to present these pages. Provide modifications as necessary based on comments resulting from the meeting.

i. Program the control system to automatically power down the AV systems each day at a time specified by the Contracting Officer. Fully power off (or place in stand-by mode) all non-critical equipment.

j. Where applicable, provide web browser-based control of each room in addition to the room touch panels.

k. Coordinate all required control system LAN settings with the Contracting Officer.

l. Include eight hours of additional programming time as a part of this Specification for any requested control system modifications after initial system acceptance but prior to the expiration of the warranty period.

3.8 SYSTEM TESTING AND ADJUSTMENT

a. Perform in accordance with ANSI/INFOCOMM 10.

b. Demonstrate that all audio system coverage is in accordance with ANSI/INFOCOMM A102.01.

c. Demonstrate that the entire scope of work defined is complete and fully functional per the scope of this specification and drawings, as well as any additional approved modifications and revisions.

d. Prior to conducting Commissioning with the Government, complete an internal quality review including a minimum of the following:

(1) Verify that all equipment has been delivered and installed per specifications. Provide a detailed equipment list sorted by room number and rack complete with make, model and serial number.

(2) Verify that all other trades have completed the work associated with the functioning of the audiovisual systems and that any installed third-party devices such as screens, shades, and lights work properly with the AV systems.

(3) Power on all equipment and verify the intended functions.

(4) Verify signal paths and cable continuity/integrity for all field terminated wiring.

(5) Adjust and align all displays for color, contrast, and geometry.

(6) Verify all communications services such as POTS, ISDN, and Ethernet.

(7) Configure and test the functionality of all audio and video conferencing systems.

(8) Load and test all DSP and control system software and provide button by button testing of all control system touch panels.

e. Provide documentation to the Contracting Officer that the systems are substantially complete at least one week in advance of Commissioning with the Government.

3.9 TEST EQUIPMENT

Provide all test equipment and test materials relative to the scope of the project to include legal copies of all source media in all appropriate formats and blank recordable media in all appropriate formats.

3.10 COMMISSIONING

a. Perform in accordance with ANSI/INFOCOMM 10.

b. After preliminary system installation and adjustment, conduct a Commissioning Test with representatives from the Government present.

c. Schedule testing to ensure the availability of all required personnel and rooms.

d. During the commissioning, demonstrate the operation of each individual piece of equipment in the system, and the system as a whole. Also demonstrate that equipment functions according to manufacturer's specifications, industry standards, and as stated in this Specification.

e. This demonstration must include a minimum of the following:

(1) A physical inventory of all equipment

(2) An evaluation of general workmanship and construction quality

(3) A mechanical check of all system components

(4) The physical operation of all system equipment (audio, video, control, and network) including button-by-button control system testing

(5) The placement of audio and video test calls

3.11 SYSTEM TRAINING AND OPERATION ASSISTANCE

a. Conduct a training program for a nominal 8 staff members as designated by the Contracting Officer to instruct on overall system and individual equipment operation, basic preventative maintenance, and basic system troubleshooting. Provide a nominal 16 hours of training which may be scheduled at the Government's request at any time up to one year following system acceptance.

b. Notify the Contracting Officer at least 14 days prior to the start of each course.

3.12 RECORD DRAWINGS

a. Submit as-built documentation upon completion, including but not limited to, the following:

(1) All information contained in the Shop Drawings submittal package

as detailed above and edited to reflect final conditions.

(2) Documentation of equipment serial numbers and network/phone/ISDN addressing scheme.

(3) Software files for touch panel interfaces, source code, DSP, and equipment settings, both compiled and un-compiled code for future system modification.

(4) Manufacturer product guides and instruction manuals

(5) Warranty information and product registration as applicable.

3.13 OPERATION AND MAINTENANCE (O&M) MANUALS

a. As-built documentation must also contain a custom-generated system operation guide that details the proper setup and usage of each system in all its normal functions and common usage scenarios as defined by the Contracting Officer. This "Step-by-Step" operation guide must contain information such as a general description of the overall system(s), instructions for general system operation such as turning the system on and off, selecting various video sources for display, routing various audio sources to the speaker systems, setting up audio bridge calls, room combining, making VTC calls, using camera presets, etc. The intent is for this manual to provide simple "how-to" instructions on operating the system. This manual must also be a supplement to the system training specified above.

b. The operations guide must include screen captures of each touch panel page (where applicable) with descriptions of the functionality of each button.

c. Submit revisions of manuals that include changes based on feedback from prior training sessions, other government comments, errors in documentation, or any altered control interface programming prior to the second training session.

d. Complete the operation guide prior to the second training session system and use it for the training.

e. Post one copy of system specific equipment interconnection drawings (laminated or in a plastic bag to prevent damage) inside the front or rear door of the main equipment for each individual audiovisual system.

f. All control system software will become the property of the Government and the Government will have the right to make any desired modifications after the expiration of the system warranty.

g. At the end of the warranty period, provide an updated copy of the above to account for any modifications that may have occurred during the warranty period.

3.14 WARRANTY AND MAINTENANCE

a. Guarantee the system for a period of one year from the date of final system acceptance against defective materials, design, workmanship, and improper adjustment. Repair or replace any defective material at no expense to the Government. During the warranty period, respond to any service calls within 24 hours excluding Saturdays, Sundays, and

holidays. Where possible, provide substitute equipment to maintain system operation during repair.

b. Provide two service calls after the acceptance of the system at months six and 12 to perform routine system maintenance and adjustment.

c. The above warranty must not void warranties issued by individual equipment manufacturers. Individual warranties valid for greater than one year must remain in full effect.

d. The above warranty must not void any rights guaranteed by law to the Government.

e. The above warranty does not pertain to Government provided equipment.

3.15 LIVE SUPPORT

Provide one service technician for 24 man-hours starting on the first scheduled use date. For a period of two week(s) after this period, provide necessary support to ensure a two-hour response time for issues that arise.

-- End of Section --

SECTION 31 00 00

EARTHWORK
08/23

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 ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO T 180	(2025) Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C600	(2023) Installation of Ductile-Iron Mains and Their Appurtenances

ASTM INTERNATIONAL (ASTM)

ASTM C33/C33M	(2024a) Standard Specification for Concrete Aggregates
ASTM C117	(2023) Standard Test Method for Materials Finer than 75-um (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C136/C136M	(2025) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C150/C150M	(2024) Standard Specification for Portland Cement
ASTM C260/C260M	(2024) Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C618	(2025a) Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C989/C989M	(2025) Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM D698	(2012; R 2021) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))
ASTM D1140	(2017) Standard Test Methods for Determining the Amount of Material Finer

	than 75-µm (No. 200) Sieve in Soils by Washing
ASTM D1556/D1556M	(2015; E 2016) Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method
ASTM D1557	(2012; E 2015) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3) (2700 kN-m/m3)
ASTM D2167	(2015) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2216	(2019) Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM D2487	(2017; R 2025) Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D2974	(2020; E 2020) Moisture, Ash, and Organic Matter of Peat and Other Organic Soils
ASTM D4253	(2016; E 2019) Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table
ASTM D4254	(2016) Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density
ASTM D4318	(2017; E 2018) Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4829	(2021) Standard Test Method for Expansion Index of Soils
ASTM D4832	(2016; E 2018) Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders
ASTM D6023	(2016) Standard Test Method for Density (Unit Weight), Yield, Cement Content, and Air Content (Gravimetric) of Controlled Low-Strength Material (CLSM)
ASTM D6103/D6103M	(2017; E 2021) Standard Test Method for Flow Consistency of Controlled Low Strength Material (CLSM)
ASTM D6938	(2017a) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

ASTM D8167/D8167M	(2023) Standard Test Method for In-Place Bulk Density of Soil and Soil-Aggregate by a Low-Activity Nuclear Method (Shallow Depth)

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements

1.2 DEFINITIONS

1.2.1 Approved Undisturbed Subgrade

Subgrade material exposed after excavation which requires inspection by the Contracting Officer. Further earthwork operations may not proceed without approval of the Contracting Officer. Provide five work days notice to the Contracting Officer prior to required inspection.

1.2.2 Structural Fill

Soil material placed to support buildings, walls, pads, and other similar facilities.

1.2.3 Embankment Fill (also referred to as General Site Fill)

Soil material placed to construct embankmentembankment(s) or placed at locations outside of structure building lines and pavement areas.

1.2.4 Porous Fill

Free-draining material placed for subsurface drainage, as a capillary break, or another specific purpose.

1.2.5 Topsoil

Surface layer of primarily organic soil capable of supporting vegetation growth.

1.2.6 Utility Bedding Material

Fill placed to directly support pipes, conduits, cables, and appurtenant structures. Bedding may also be used to provide a cushion between utilities and bedrock, obstacles, obstructions and other unyielding materials.

1.2.7 Flowable Fill

Fill placed in a plastic or liquid form that flows to near its final placement location with limited assistance and subsequently cures or solidifies to provide a stable or impermeable barrier. VDOT RBS Section 249 FLOWABLE BACKFILL. Design compressive strength shall be 100 pounds per square inch at 28 days.

1.2.8 Satisfactory Materials

Satisfactory materials for fill, backfill, and/or any in-situ soils to remain in place comprise any materials classified by ASTM D2487 as GW, GP,

GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, SM, SW-SM, SC, SW-SC, SP-SM, SP-SC, and CL, free of debris, roots, wood, scrap material, vegetation, refuse, soft or unsound particles, and frozen, deleterious or objectionable materials. Maximum particle size to be no greater than 3 inches in any dimension.

1.2.9 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials also include man-made fills; trash; refuse; backfills from previous construction; roots and other organic matter or frozen material. Notify the Contracting Officer when encountering any contaminated materials.

1.2.10 Cohesionless Materials

Cohesionless materials include materials classified in ASTM D2487 as GW, GP, SW, and SP. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic. Perform testing, required for classifying materials, in accordance with ASTM D4318, ASTM C117, ASTM C136/C136M and ASTM D1140.

1.2.11 Cohesive Materials

Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesive only when the fines are plastic. Perform testing, required for classifying materials, in accordance with ASTM D4318, ASTM C117, ASTM C136/C136M and ASTM D1140.

1.2.12 Hard/Unyielding Materials

Hard/Unyielding materials comprise weathered rock, dense consolidated deposits, or conglomerate materials which are not included in the definition of "rock" with stones greater than 3 inch in any dimension or as defined by the pipe manufacturer, whichever is smaller. These materials usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal.

1.2.13 Unstable Material

Unstable materials are too weak to adequately support the utility pipe, conduit, equipment, or appurtenant structure. Satisfactory material may become unstable due to ineffective drainage, dewatering, becoming frozen, excessive loading.

1.2.14 Expansive Soils

Expansive soils are defined as soils that have an expansion index greater than 20 when tested in accordance with ASTM D4829.

1.2.15 Rock

Solid homogeneous interlocking crystalline material with firmly cemented, laminated, or foliated masses or conglomerate deposits, neither of which can be removed without systematic drilling and blasting, drilling and the use of expansion jacks or feather wedges, or the use of backhoe-mounted pneumatic hole punchers or rock breakers; also large boulders, buried masonry, or concrete other than pavement exceeding 1/2 cubic yard in

volume. Removal of hard material will not be considered rock excavation because of intermittent drilling and blasting that is performed merely to increase production.

1.2.16 Capillary Water Barrier

A layer of clean, poorly graded crushed rock, stone, or natural sand or gravel having a high porosity which is placed beneath a building slab with or without a vapor barrier to cut off the capillary flow of pore water to the area immediately below a slab.

1.2.17 Degree of Compaction (Proctor)

Degree of compaction required, except as noted in the second sentence, is expressed as a percentage of the maximum dry density obtained by the test procedure presented in ASTM D1557 abbreviated as a percent of laboratory maximum dry density. Since ASTM D1557 applies only to soils that have 30 percent or less by weight of their particles retained on the 3/4 inch sieve, express the degree of compaction for material having more than 30 percent by weight of their particles retained on the 3/4 inch sieve as a percentage of the maximum dry density in accordance with AASHTO T 180-21 paragraph 1.5, Note 1.

1.2.18 Degree of Compaction (Relative Density)

Degree of compaction required for soils with less than 5 percent passing the No. 200 sieve, is expressed as a relative percentage of the maximum index density/dry unit weight and minimum index density/dry unit weight, obtained by the test procedures in accordance with ASTM D4253 and ASTM D4254, respectively, abbreviated as a percent of laboratory relative density.

1.2.19 Borrow

Soil brought to the project site from an external location for the purposes of project construction.

1.2.20 Subgrade

Earth materials directly below foundations and directly below granular base materials in building slab and pavement areas including shoulders.

1.2.21 Geotechnically Unsuitable Subgrade

Existing subgrade materials that exhibit insufficient strength or excessive movement after proper execution of work specified in Paragraphs PROTECTION, SURFACE PREPARATION, EXCAVATION and SUBGRADE PREPARATION. Unsuitable subgrade also contains soil mixed with appreciable degradable matter such as organic material, wood, trash and non-inert debris which may affect the performance or life expectancy of the supported facility. Unsuitable subgrade will be determined by the Contractor's Geotechnical Engineer and confirmed by the Contracting Officer. Existing subgrade soil materials which do not comply with the requirements for satisfactory materials do not necessarily classify as Geotechnically Unsuitable Subgrade.

1.3 SUBSURFACE DATA

Subsurface soil boring logs are shown in the geotechnical data report.

These data represent available subsurface information; however, variations in data presented in the logs may exist between boring locations.

1.4 CRITERIA FOR BIDDING

Base bids on the following criteria:

a. Surface elevations are as indicated.

b. Pipes or other artificial obstructions, except those indicated, will not be encountered.

c. Ground water elevations indicated by the boring log were those existing at the time subsurface investigations were made and do not necessarily represent ground water elevation at the time of construction.

d. Refer to the Geotechnical Data Report, both of which are attached to Part 6 of this RFP. Seasonal perched water table conditions must be expected during periods of wet weather at a depth of approximately 5 feet below existing ground surface. Employ measures and equipment to permit construction to proceed during periods of wet weather..

e. Material character is indicated by the boring logs.

f. Hard materials and rock will not be encountered.

g. Borrow material is not available on the project site or from Government sources. Excavated onsite soils removed from planned excavations will require processing and moisture conditioning and may only be re-used as embankment fill or placed in designated onsite Surplus Soil Fill Areas.

h. On-site material only meets requirements specified herein for embankment fill.

i. Unsuitable soils encountered during excavation must be removed and replaced with structural fill, select fill or aggregate base course (ABC) material, as directed by the Contracting Officer. Payment for removal and replacement of unsuitable material with structural fill, select fill and/or aggregate base course material must be at the contract unit price per cubic yard, multiplied by the total quantity of cubic yards, as specified in the document title "Price Schedule". Include in the bid a unit price per unit cubic yard based on the quantity stated in the document titled "Price Schedule". If the Contracting Officer requires an increase or decrease in the quantity of soil removed and replaced with structural fill, select fill, and/or ABC material, the contract price will be adjusted in accordance with the Contract Clause of the contract. The unit price bid will be used for upward or downward adjustment of the quantity subject to provisions of "FAR 52.211-18, Variations in estimated Quantities".

j. Remove material in an approved manner.

k. Removal of unknown buried concrete, pipes and debris not identified on the project plans and greater than 1 cubic yard in volume from planned excavations will be paid for under the Unit Price Line Item on the Price Proposal Form.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Submit 15 days prior to starting work, unless noted otherwise.

Excavation and Trenching Plan; G

Borrow Plan; G

Dewatering Work Plan; G

Disposition of Surplus Materials; G

Preconstruction Meeting; G

SD-03 Product Data

Flowable Fill Mix Design; G

SD-06 Test Reports

Material Test Report; G

Borrow Site Testing; G

Pipe Inspection Report; G

Geotechnical Evaluation Report; G

SD-07 Certificates

Material for Rip-Rap; G

1.6 QUALITY CONTROL

1.6.1 Geotechnical Engineer

Provide a Professional Geotechnical Engineer to provide inspection of excavations and soil/groundwater conditions throughout construction. The Geotechnical Engineer is responsible for performing pre-construction and periodic site visits throughout construction to assess site conditions. The Geotechnical Engineer is responsible for preparing and updating the Excavation and Trenching Plan and Dewatering Work Plan as construction progresses to reflect changing conditions and submit an updated plan if necessary. Submit a monthly Geotechnical Evaluation report, informing the Contractor and Contracting Officer of the status of the plan and an accounting of the Contractor's adherence to the plan addressing any present or potential problems. The Contractor is responsible for arranging meetings with the Geotechnical Engineer and Contracting Officer throughout the contract duration.

1.6.2 Qualified Technician

Provide a Qualified Technician to inspect, monitor, sample, and performing field testing. The technician qualifications need to be one of the following: a current National Institute for Certification in Engineering Technologies (NICET) Level II minimum certification in Construction Materials Testing Soils; a Geologist-in-Training with minimum one-year experience; an Engineer-in-Training with minimum one-year experience; a Registered Geologist; or a Professional Engineer.

1.6.3 Lab Validation

Perform testing by a Corps validated commercial testing laboratory or Contractor established testing laboratory meeting the requirements of Section 01 45 00 (or similar number) entitled QUALITY CONTROL and approved by the Contracting Officer. Submit testing laboratory validation for the testing to be performed. Do not permit work requiring testing until testing facilities have been inspected, Corps validated and approved by the Contracting Officer.

1.6.4 Preconstruction Meeting

Conduct a preconstruction meeting at the jobsite at least five business days prior to the start of earthwork operations on the project. The preconstruction meeting must be arranged by the Contractor and is to follow the written agenda submitted to the Government prior to the meeting. The purpose of this meeting is to review the requirements of this specification and the associated plans. The following individuals must be in attendance at this meeting: Contractor's Project Manager and Project Superintendent, earthwork subcontractor's Project Manager and Site Foreman, Contractor's Geotechnical Engineer and Testing Agency representative, Government Geotechnical Engineer and Civil Engineer, and Government Construction Manager and Engineering Technician.

The minutes of this meeting are to be recorded by the Contractor and published via email within 48 hours to all attendees. The minutes must be re-published within 48 hours via email pending any subsequent comments from the attendees.

1.6.5 Dewatering Work Plan

Submit procedures for accomplishing dewatering work. The plan must address and describe how the Contractor will accomplish the required site preparation and excavation work when surface and/or subsurface water is present.

1.6.6 Special Inspections

Perform Special Inspections and testing in accordance with Section 01 45 35 SPECIAL INSPECTIONS.

1.6.7 Utilities

Movement of construction machinery and equipment over pipes and utilities during construction must be at the Contractor's risk. Excavation made with power-driven equipment is not permitted within two feet of known Government-owned utility or subsurface construction. For work immediately adjacent to or for excavations exposing a utility or other buried obstruction, excavate by hand. Start hand excavation on each side of the

indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Support uncovered lines or other existing work affected by the contract excavation until approval for backfill is granted by the Contracting Officer. Report damage to utility lines or subsurface construction immediately to the Contracting Officer.

1.6.8 Excavation and Trenching Plan

Submit an Excavation and Trenching Plan a minimum of 15 days prior to planned start of excavation. The plan must outline the projected depth of the excavation based on soil characteristics and the planned method of sloping, benching, sheeting/shoring, and stabilizing soil to permit construction to progress. Submit drawings and sketches; showing limits methods, and sequencing of excavation, proposed onsite and offsite soil disposal areas; and the numbers, types, and sizes of equipment proposed to perform excavations. The work plan must address any anticipated difficulties and proposed resolutions.

1.6.9 Shoring and Sheeting Plan

Submit drawings and calculations, certified by a registered professional engineer, describing the methods for shoring and sheeting of excavations. Drawings must include material sizes and types, arrangement of members, and the sequence and method of installation and removal. Calculations must include data and references used. Update the plan throughout the work as conditions warrant.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

2.1.1 Environmental Requirements for Offsite Soil

Soils brought in from off site for use as backfill shall be tested via representative in-situ testing for the State of Virginia DEQs Table 2 (Management of and Reuse of Contaminated Media Guidance/#LPR-SW-01-2012) and additional analysis as required by the Installation as listed below:

Target Analyte List (TAL) Inorganics (total metals)
Target Compound List (TCL) Volatile Organic Compounds (VOCs), including benzene, toluene, ethylbenzene, and xylene
TCL Semi-Volatile Organic Compounds (SVOCs)
TCL Polychlorinated Biphenyl's (PCBs)
TCL Pesticides
Chlorinated Dioxins
Total Petroleum Hydrocarbons (TPH)
Total Organic Halogen/Halide (TOX)
Per and Polyfluoroakyl Substances (PFAS)

All analysis, methods, and sample collection must be conducted in accordance with EPA SW-846 test methods for evaluating solid waste, Physical/Chemical methods. PFAS must be analyzed and collected via EPA standard operating procedures and method in accordance with the DoD QSM V 5.3, Table B-15. Analytical laboratories must be ELAP certified/accredited and provided to the Installation Environmental Hazardous Waste program manager for approval prior to sample collection. Refer to section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS for testing and reporting.

Backfill shall not contain concentrations of these analytes above the appropriate State and/or EPA criteria. Provide borrow site testing for petroleum hydrocarbons and BTEX from a grab sample of material from the area most likely to be contaminated at the borrow site (as indicated by visual or olfactory evidence), with at least one test from each borrow site. For each borrow site, provide borrow site testing from a composite sample of material, collected in accordance with standard soil sampling techniques. Do not bring material onsite until tests results have been received and approved by the Installation Environmental Hazardous Waste Program Manager and Contracting Officer.

2.1.2 Structural Fill

Materials classified as cohesionless GW, GP,GM, SW, SP, or SM in accordance with ASTM D2487 and having a maximum of 20 percent passing the No. 200 sieve in accordance with ASTM D1140. Select material type appropriate for the intended purpose.

2.1.3 Embankment Fill (also referred to as General Site Fill)

Materials meeting requirements specified herein for satisfactory materials and approved unclassified soil material with characteristics required to compact to the soil density specified for the intended location.

2.1.4 Select Material

Materials meeting requirements of ASTM C33/C33M, size No. 57 crushed stone.

2.1.5 Porous Fill (Capillary Water Barrier)

Conform to ASTM C33/C33M for fine aggregate grading with a maximum of 3 percent by weight passing ASTM D1140, No. 200 sieve, or coarse aggregate Size 57, 67, or 77.

2.1.6 Utility Bedding Material

Except as specified otherwise in the individual piping section or indicated otherwise, provide bedding for buried piping in accordance with AWWA C600 Type 4. Backfill to top of pipe must be compacted to 95 percent of ASTM D698 maximum density. Plastic piping must have bedding to the spring line of the pipe. Provide material meeting requirements for select material.

2.2 FLOWABLE FILL

Design and submit flowable fill mix design to consist of Portland cement, fly ash, and/or slag cement and fine aggregate. Include the dry weights of cementitious material(s); quality and gradation of aggregates in the saturated surface-dry weights along with gradation tests; quantities, types, and names of admixtures; and quantity of water per cubic yard. The minimum unconfined compressive strength to be 100 psi at 28 days in accordance with ASTM D4832. The aggregates in accordance with ASTM C33/C33M Fine Aggregates. Air-entrain fill in accordance with ASTM C260/C260M. The air content to be between 8 and 15 percent in accordance with ASTM D6023. The flow to be between 8 and 12 inches in accordance with ASTM D6103/D6103M. Portland cement to be Type I or II in accordance with ASTM C150/C150M. Fly ash to be Class C in accordance with ASTM C618. Provide slag cement in Grade 100 or 120 in accordance with ASTM C989/C989M.

2.3 BURIED WARNING AND IDENTIFICATION MARKERS

Provide polyethylene plastic and metallic core or metallic-faced, acid- and alkali-resistant, polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, 3 inches minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar wording. Provide permanent color and printing, unaffected by moisture or soil.

Warning Tape Color Codes	
Red	Electric
Yellow	Gas, Oil; Dangerous Materials
Orange	Telephone and Other Communications
Blue	Water Systems
Green	Sewer Systems
White	Steam Systems
Gray	Compressed Air

2.3.1 Warning Tape for Metallic Piping

Provide acid and alkali-resistant polyethylene plastic tape conforming to the width, color, and printing requirements specified above, with a minimum thickness of 0.003 inch and a minimum strength of 1500 psi lengthwise, and 1250 psi crosswise, with a maximum 350 percent elongation.

2.3.2 Detectable Warning Tape for Non-Metallic Piping

Provide polyethylene plastic tape conforming to the width, color, and printing requirements specified above, with a minimum thickness of 0.004 inch, and a minimum strength of 1500 psi lengthwise and 1250 psi crosswise. Manufacture tape with integral wires, foil backing, or other means of enabling detection by a metal detector when tape is buried up to 3 feet deep. Encase metallic element of the tape in a protective jacket or provide with other means of corrosion protection.

2.3.3 Detection Wire for Non-Metallic Piping

Insulate a single strand, solid copper detection wire with a minimum of 12 AWG.

2.4 MATERIAL FOR RIP-RAP

Rock material for erosion control rip-rap shall conform to VDOT RBS, Section 414, Class A1, unless indicated otherwise, provide a certificate for each Class or Type rip-rap rip-rap material used that material meets specified requirements. Submit material for rip-rap documentation 14 days

prior to start of work.

2.5 BORROW

Provide borrow materials that meet requirements specified from sources located outside of Government property.

PART 3 EXECUTION

3.1 PROTECTION

Perform all work specified in accordance with applicable requirements of the Corps of Engineers publication EM 385-1-1 Safety and Health Requirements Manual. Provide a Geotechnical Engineer to monitor construction activities and to prepare necessary work plans and reports; see paragraph QUALITY CONTROL.

Use equipment of type and size appropriate for the site conditions (soil character and moisture content). Maintenance of exposed subgrades and fills is the responsibility of the Contractor. The Contractor is required to prevent damage by ineffective drainage, dewatering, and heavy loads and equipment by implementing precautionary measures. Repair or replace any defects or damage at his expense.

3.1.1 Underground Utilities

Location of the existing utilities indicated is approximate. Physically verify the location and elevation of the existing utilities indicated prior to starting construction. The Contractor must scan the construction site with electromagnetic and sonic equipment and mark the surface of the ground where existing underground utilities are discovered. The Contractor is responsible for protecting utilities from damage during construction.

3.1.2 Drainage and Dewatering

Provide for the collection and disposal of surface and subsurface water encountered during construction.

3.1.2.1 Drainage

Provide for the collection and disposal of surface and subsurface water encountered during construction to keep soil materials sufficiently dry. The Contractor must establish/construct storm drainage features (ponds/basins) at the earliest stages of site development, and throughout construction grade the construction area to provide positive surface water runoff away from the construction activityand provide temporary ditches, swales, and other drainage features and equipment as required to keep soils from becoming unstable, prevent erosion, or undermining of foundations. When unsuitable working platforms for equipment operation and unsuitable soil support for subsequent construction features develop, remove unsuitable material and provide new soil material as specified herein. It is the responsibility of the Contractor to assess the soil and groundwater conditions presented by the construction documents and to employ necessary measures to permit construction to proceed. Protect excavated slopes and backfill surfaces to prevent erosion and sloughing. Perform excavation so that the site shall be continually and effectively drained.

3.1.2.2 Dewatering

Control groundwater flowing toward or into excavations to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. French drains, sumps, ditches or trenches are not allowed within 3 feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Perform control measures by the time the excavation reaches the water level in order to maintain the integrity of the in-situ material. While the excavation is open, maintain the water level continuously, at least 2 feet below the working level. Operate dewatering system continuously until construction work below existing water levels is complete.

3.1.3 Shoring and Sheeting

Provide shoring and sheeting as needed to stabilize features, prevent undermining or unintended horizontal and vertical movement of adjacent structures, and prevent slippage or movement in banks or slopes adjacent to the excavation.

3.1.4 Protection of Graded Surfaces

Protect newly backfilled, graded, and topsoiled areas from traffic, erosion, and settlements that may occur. Repair or reestablish damaged grades, elevations, or slopes.

3.1.5 Machinery and Equipment

Movement of construction machinery and equipment over pipes during construction must be at the Contractor's risk. Repair, or remove and provide new pipe for existing or newly installed pipe that has been displaced or damaged.

3.2 BORROW

Select borrow material to meet the requirements and conditions of the fill or embankment for which it is to be used. Obtain borrow material from approved private sources. Submit a Borrow Plan, borrow site soil testing results as specified in paragraph CONTRACTOR FURNISHED BORROW AREA (S). Unless otherwise provided in the contract, the Contractor is responsible for obtaining the right to procure material, pay royalties and other charges involved, and bear the expense of developing the sources, including rights-of-way for hauling from the owners. Unless specifically provided, do not obtain borrow within the limits of the project site without prior written approval.

3.2.1 Contractor Furnished Borrow Area(s)

Obtain approved borrow materials from approved offsite sources. If a borrow source is selected that is not a commercial entity from which soil material is directly purchased, submit a Borrow Plan that includes the borrow source location, geotechnical test results showing the fill material meets the Contract requirements, environmental test results in accordance with paragraph ENVIRONMENTAL REQUIREMENTS FOR OFF-SITE SOIL, and any Federal, State, and local permits required for excavation and reclamation of the borrow area.

3.2.1.1 Stripping and Stockpiling Operations in Borrow Area

Strip in accordance with paragraph STRIPPING. Strip at least 5 feet beyond the limits of the borrow excavation and any stockpiles of fill and embankment materials.

Stockpile materials within the borrow area work limits such that the stockpiles does not interfere with borrow operations. Stockpile borrow material awaiting transport in approved segregated piles. Maintain a minimum of 30 feet between all stockpile toes and the top of the borrow cut.

3.3 SURFACE PREPARATION

3.3.1 Clearing and Grubbing

Remove trees, stumps, logs, shrubs, brush and vegetation and other items that would interfere with construction operations. Remove stumps entirely. Grub out matted roots and roots over 3 inches in diameter to at least 18 inches below existing surface.

3.3.2 Stripping

Strip site where clearing and grubbing, excavation or grading are indicated. Strip existing surface materials to a depth of 6 inches below the existing ground surface in areas designated as Clear and Grub on the plans. Strip existing surficial soils to a depth of 6 inches in all other areas. Strip in all areas within the planned limits of disturbance. All stripped materials not suitable for reuse as topsoil will be wasted in specified disposal area. Screen all stripped soils to remove roots and organic materials prior disposal.

3.3.3 Proof Rolling

Perform proof rolling on exposed subgrade that is unfrozen and free of surface water (wet conditions resulting from rainfall). Notify the Contracting Officer a minimum of three days prior to proof rolling. Perform proof rolling in the presence of the Contracting Officer.

After stripping, excavating, and rough grading to the planned elevation, proof roll the existing subgrade of all building, pavement and embankment locations with six passes of a loaded tandem axle dump truck 15 ton, pneumatic-tired or smooth drum roller. Operate the roller, truck in a systematic manner to ensure the number of passes over all areas, and at speeds between 2.5 to 3.5 miles per hour. Subgrade materials that exhibit excessive deflection and/or rutting during proof rolling need to be scarified, aerated, and re-compacted to specified density at plus or minus 2 percent of optimum moisture content prior to being considered for remedial action by the Contracting Officer. When proof rolling under buildings, the building subgrade is considered to extend 5 feet beyond the building lines, and make one-half of the passes with the roller in a direction perpendicular to the other passes.

3.3.4 Stockpiling Operations

Place and grade stockpiles of materials remaining on site as specified. Keep stockpiles in a neat and well drained condition, giving due consideration to drainage at all times. Clear, grub, and seal by rubber-tired equipment, the ground surface at stockpile locations;

separately stockpile excavated satisfactory and unsatisfactory materials. Protect stockpiles of satisfactory materials from contamination which may destroy the quality and fitness of the stockpiled material. Do not create stockpiles that could obstruct the flow of any stream, endanger a partly finished structure, impair the efficiency or appearance of any structure, or be detrimental to the completed work in any way. If the Contractor fails to protect the stockpiles, and any material becomes unsatisfactory, the contractor must remove and replace such material with satisfactory material from approved sources.

3.4 EXCAVATION

Excavate to contours, elevation, and dimensions indicated. Excavate soil disturbed or weakened by Contractor's operations, and soils softened or made unstable for subsequent construction due to exposure to weather. Use material removed from excavations meeting the specified requirements in the construction of fills, embankments, subgrades, shoulders, bedding (as backfill), and for similar purposes to minimize surplus material and to minimize additional material to brought on site. Do not excavate below indicated depths except to remove unstable material as determined by the Geotechnical Engineer and confirmed by the Contracting Officer. Remove and replace excavations below the grades shown with structural fill or select fill materials as directed by the Contracting Officer.

If at any time during excavation, including excavation from borrow areas, the Contractor encounters material that may be classified as rock or as hard/unyielding material, uncover such material, and notify the Contracting Officer. Do not proceed with the excavation of this material until the Contracting Officer has classified the materials as common excavation or rock excavation. Failure on the part of the Contractor to uncover such material, notify the Contracting Officer, and allow sufficient time for classification and delineation of the undisturbed surface of such material will cause the forfeiture of the Contractor's right of claim to any classification or volume of material to be paid for other than that allowed by the Contracting Officer for the areas of work in which such deposits occur.

3.4.1 Ditches, Gutters, and Channel Changes

Finish excavation of ditches, gutters, and channel changes by cutting accurately to the cross sections, grades, and elevations shown. Do not excavate below grades shown. Backfill excessive excavation as directed by the Contracting Officer, with satisfactory, compacted, material or with suitable stone or cobble to grades shown. Dispose excavated material as shown or as directed. Do not allow material to be deposited within 4 feet from edge of a ditch. Maintain excavations free from detrimental quantities of leaves, brush, sticks, trash, and other debris until final acceptance of the work.

3.4.2 Trench Excavation Requirements

Excavate the trench as recommended by the manufacturer of the pipe to be installed. Slope trench walls below the top of the pipe, or make vertical, and of such width as recommended by the manufacturer. Provide vertical trench walls where no manufacturer installation instructions are available. Do not exceed the trench width of 24 inches below the top pipe plus pipe outside diameter (O.D.) for pipes of less than 24 inches inside diameter, and do not exceed 36 inches plus pipe outside diameter for pipe sizes larger than 24 inches inside diameter. Where recommended trench

widths are exceeded, provide redesign, stronger pipe, or special installation procedures. The Contractor is responsible for the cost of redesign, stronger pipe, or special installation procedures without any additional cost to the Government.

3.4.2.1 Bottom Preparation

Grade the bottoms of trenches accurately to provide uniform bearing and support for the bottom quadrant of each section of the pipe after bedding placement. Tamp if necessary to provide a firm pipe bed. Excavate recesses in the bedding material to accommodate bells and joints to eliminate point bearing. Remove stones of 2 inch or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, to avoid point bearing.

3.4.2.2 Removal of Unyielding Material

Where unstable material is encountered in the bottom of the trench, remove such material to the depth directed and replace it to the proper grade with suitable material as provided in paragraph FILLING AND COMPACTION. When removal of unstable material is required due to the Contractor's fault or neglect in performing the work, the Contractor is responsible for excavating the resulting material and replacing it without additional cost to the Government.

3.4.2.3 Removal of Unstable Material

Where unstable material is encountered in the bottom of the trench, remove such material to the depth directed and replace it to the proper grade with suitable material as provided in paragraph FILLING AND COMPACTION. When removal of unstable material is required due to the Contractor's fault or neglect in performing the work, the Contractor is responsible for excavating the resulting material and replacing it without additional cost to the Government.

3.4.2.4 Excavation for Appurtenances

Provide excavation for manholes, catch-basins, inlets, or similar structures sufficient to leave at least 12 inches clear between the outer structure surfaces and the face of the excavation or support members or of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown.

3.4.2.5 Gas Distribution

Excavate trenches to a depth that will provide a minimum 18 inches of cover in rock excavation and a minimum 24 inches of cover in other excavation.

3.4.2.6 Water Lines

Excavate trenches to a depth that provides a minimum cover of 3 feet from the existing ground surface, or from the indicated finished grade, whichever is lower, to the top of the pipe.

3.4.3 Underground Utilities

Perform work adjacent to utilities in accordance with procedures outlined by utility owner. Report damage to utility lines or subsurface

construction immediately to the Contracting Officer.

3.4.4 Structural Excavation

Do not excavate to final grade until just before concrete is to be placed. Roughen level surfaces. Cut sloped surfaces as indicated into rough steps or benches to provide a satisfactory bond for compacting materials. For new pavement areas including exterior concrete pads, over-excavate to a minimum of 12 inches below bottom of new pavement/pad base course, scarify, moisture-condition, and compact to at least 95 percent.

Make excavations to the lines, grades, and elevations shown, or as directed. Provide trenches and foundation pits of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. Clean rock or other hard foundation material of loose debris and cut to a firm, level, stepped, or serrated surface. Remove loose disintegrated rock and thin strata.

Concrete placement is not allowed until footing subgrades have been inspected and approved by the Contracting Officer.

3.4.5 Pile Cap Excavation

Stop the excavation at an elevation 6 to 12 inches above the bottom of the footing before driving piles. After pile driving has been completed, complete the remainder of the excavation to the elevations shown. Excavate to bottom of pile cap prior to placing or driving piles, unless authorized otherwise by the Contracting Officer. After the pile driving has been completed, remove loose and displaced material and complete excavation, leaving a smooth, solid, undisturbed surface to receive the concrete or masonry. Backfill and compact over-excavations and changes in grade due to pile driving operations to 95 percent of ASTM D1557 maximum dry density.

3.5 SUBGRADE PREPARATION

3.5.1 General Requirements

Shape subgrade to line, grade, and cross section as indicated. Remove unsatisfactory and unstable material in surfaces to receive fill or in excavated areas. Do not place material on surfaces that are muddy, frozen, contain frost, or otherwise containing unstable material. Scarify the surface to a depth of 4 inches prior to placing fill. Step or bench sloped surfaces steeper than 1 vertical to 4 horizontal prior to scarifying. Place 4 inches of loose fill and blend with scarified material. When subgrade is part fill and part excavation or natural ground, scarify to a depth of 8 inches.

3.5.2 Subgrade for Structures, Spread Footings, and Concrete Slabs

Do not excavate below depth shown for structures, spread footings, and concrete slabs. If over excavation occurs, notify the Contracting Officer and remove, replace, and compact as directed.

3.5.3 Subgrade for Pavements

Compact top 12 inches of subgrade for pavements to at least 95 percent of ASTM D1557.

3.5.4 Subgrade for Pavement Shoulders (Area within 3 feet of pavement)

Compact the upper 12 inches of subgrade for shoulders to at least 95 percent of ASTM D1557.

3.6 FILLING AND COMPACTION

Prepare ground surface on which backfill is to be placed and provide compaction requirements for backfill materials in conformance with the applicable portions of paragraphs for SUBGRADE PREPARATION. Do not place material on surfaces that are muddy, frozen, or contain frost. Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other approved equipment well suited to the soil being compacted. Moisten material as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used. Fill and backfill to contours, elevations, and dimensions indicated. Compact and test each lift before placing overlaying lift.

3.6.1 Trench Backfill

Backfill as rapidly as construction, testing, and acceptance of the work permits. Backfill trenches to the grade shown. Backfill the trench to atleast 2 feet above the top of pipe prior to performing the required pressure tests. Leave the joints and couplings uncovered during the pressure test.

3.6.1.1 Replacement of Unstable/Unsuitable Material

Replace unstable/unsuitable material removed from the bottom of the trench or excavation with sstructural fill or select fill material, as directed by the Contracting Officer, placed in layers not exceeding 6 inches loose thickness.

3.6.1.2 Bedding and Initial Backfill

Provide bedding as indicated. Place initial backfill material and compact it with approved tampers to a height of at least one foot above the utility pipe or conduit. Bring up the backfill evenly on both sides of the pipe for the full length of the pipe. Take care to ensure thorough compaction of the fill under the haunches of the pipe. Except where shown or when specified otherwise in the individual piping section, provide bedding for buried piping in accordance with PART 2 paragraph UTILITY BEDDING MATERIAL. Compact backfill to top of pipe to 85 percent of ASTM D1557. Provide plastic piping with bedding to spring line of pipe.

3.6.1.3 Final Backfill

Do not begin backfill until construction below finish grade has been approved, underground utilities systems have been inspected, tested and approved, forms removed, and the excavation cleaned of trash and debris. Bring backfill to indicated finish grade. Where pipe is coated or wrapped for protection against corrosion, the backfill material up to an elevation 2 feet above sewer lines and one foot above other utility lines need to be free from stones larger than one inch in any dimension. Heavy equipment for spreading and compacting backfill are not to be operated closer to foundation or retaining walls than a distance equal to the height of backfill above the top of footing; compact remaining area in layers not more than 4 inches in compacted thickness with power-driven hand tampers suitable for the material being compacted. Place backfill carefully

around pipes or tanks to avoid damage to coatings, wrappings, or tanks. Do not place backfill against foundation walls prior to 7 days after completion of the walls. As far as practicable, bring backfill up evenly on each side of the wall and sloped to drain away from the wall.

Fill the remainder of the trench, except for special materials for buildings and pavements with satisfactory material. Place backfill material and compact as follows:

3.6.1.3.1 Buildings and Pavements

Place backfill in 6 inch lifts to the top of the trench and compact it to 95 percent of ASTM D1557 maximum density. Do not permit water flooding or jetting methods of compaction. Compact as specified for Structural Fill.

3.6.1.3.2 Turfed or Seeded Areas and Miscellaneous Areas (General Site Fill Areas)

Deposit backfill in layers of a maximum of 12 inches loose thickness, and compact it to 85 percent maximum dry density for cohesive soils and 90 percent maximum dry density for cohesionless soils. Apply this requirement to all other areas not specifically designated above.

3.6.1.4 Displacement of Features

After other required tests have been performed and the trench backfill compacted to the finished grade surface, inspect the pipe to determine whether unexpected or damaging displacement has occurred. Conduct walk-through inspection of pipe sizes larger than 48 inches. Inspect pipes smaller than 48 inches using remote methods using closed circuit television, sonar, or hybrid that can provide a 360-degree inspection of the pipe. Prepare and submit a pipe inspection report consisting of digital video or photos. If, in the judgment of the Contracting Officer, the interior of the pipe shows poor alignment or any other defects that would cause improper functioning of the system, replace or repair the defects as directed at no additional cost to the Government.

3.6.1.5 Buried Tape And Detection Wire

3.6.1.5.1 Buried Warning and Identification Tape

Provide buried utility lines with utility identification tape. Bury tape 12 inches below finished grade; under pavements and slabs, bury tape 6 inches below top of subgrade.

3.6.1.5.2 Buried Detection Wire

Bury detection wire directly above non-metallic piping at a distance not to exceed 12 inches above the top of pipe. Extend the wire continuously and unbroken, from manhole to manhole. Terminate the ends of the wire inside the manholes at each end of the pipe, with a minimum of 3 feet of wire, coiled, remaining accessible in each manhole. Furnish insulated wire over its entire length. Install wires at manholes between the top of the corbel and the frame, and extend up through the chimney seal between the frame and the chimney seal. For force mains, terminate the wire in the valve pit at the pump station end of the pipe.

3.6.2 Structural Fill Placement

Place fill and backfill beneath and adjacent to structures in successive horizontal layers of loose material not more than 8 inches in depth, or in loose layers not more than 4 inches in depth when using hand-operated compaction equipment. Do not place over wet or frozen materials. Compact to at least 90 percent of laboratory maximum dry density for cohesive materials or 95 percent of laboratory maximum dry density for cohesionless materials, except as otherwise specified. Perform compaction in such a manner as to prevent wedging action or eccentric loading upon or other damage to the structure. Moisture condition fill and backfill material to a moisture content that will readily facilitate obtaining the specified compaction.

3.6.3 Backfill for Appurtenances

After the manhole, catchbasin, inlet, or similar structure has been constructed and the concrete has been allowed to cure for 7 days, place backfill in such a manner that the structure is not be damaged by the shock of falling earth. Deposit the backfill material, compact it as specified for final backfill, and bring up the backfill evenly on all sides of the structure to prevent eccentric loading and excessive stress.

3.6.4 Porous Fill Placement

Provide under floor and area-way slabs on a compacted subgrade. Place in a single lift and compact with a minimum of two passes of a hand-operated plate-type vibratory compactor.

3.6.5 Flowable Fill

Place fill in a manner to completely fill voids in the location indicated. Do not place when atmospheric temperatures are expected to be below 33 degrees F at any time during the 3 day period following placement.

3.6.6 Compaction

Determine in-place relative compaction of existing subgrade after proof rolling in areas where building structures and pavements are proposed. Compaction of existing subgrade in areas used for support of building structures, tanks, footings and slabs shall be uniformly moisture-conditioned to a minimum depth of 8 inches within plus or minus 2 percent of optimum moisture content and meet a minimum of 90 percent relative compaction in accordance with ASTM D1557. Relative compaction testing is not required for areas indicated "Approved Undisturbed Subgrade". Relative compaction testing is not required under curb inlets and manhole structures if proof rolling demonstrates a stable and non-yielding subgrade.

Further earthwork operations may not proceed without inspection and approval by the Contracting Officer.

3.6.6.1 General Site

Compact underneath areas designated for vegetation and areas outside the 5 foot line of the paved area or structure to 90 percent of ASTM D1557.

3.6.6.2 Structures, Spread Footings and Concrete Slabs

Unless indicated as "Approved Undisturbed Subgrade", compact the top 8 inches of subgrades to 90 percent of ASTM D1557. Compact structural fill and select fill to 95 percent of ASTM D1557.

3.6.6.3 Adjacent Areas

Compact areas within 5 feet of structures to 95 percent of ASTM D1557.

3.6.6.4 Paved Areas

Compact areas of fill and the top 12 inches of subgrade within 3 feet of pavement to 95 percent of ASTM D1557.

3.6.6.5 Pavement Shoulder Areas

Compact areas of fill and the top 12 inches of subgrade within 3 feet of pavement to 95 percent of ASTM D1557.

3.7 EMBANKMENTS

3.7.1 Earth Embankments

Construct earth embankments from satisfactory materials free of organic or frozen material and rocks with any dimension greater than 3 inches. Place the material in successive horizontal layers of loose material not more than 8 inches in depth. Spread each layer uniformly on a soil surface that has been moistened or aerated as necessary and scarified or otherwise broken up so that the fill will bond with the surface on which it is placed. After spreading, plow, disk, or otherwise break up each layer; moisten or aerate as necessary; thoroughly mix; and compact to at least 90 percent laboratory maximum dry density for cohesive materials or 95 percent laboratory maximum dry density for cohesionless materials. Backfill and fill material are to be within the range of minus 2 to plus 2 percent of optimum moisture or to a moisture content that will readily facilitate obtaining the specified compaction.

Compaction requirements for the upper portion of earth embankments forming subgrade for pavements are identical with those requirements specified in paragraph SUBGRADE PREPARATION. Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

3.8 RIP-RAP CONSTRUCTION

Construct rip-rap in the areas indicated. Trim and dress indicated areas to conform to cross sections, lines and grades shown within a tolerance of 0.1 foot.

3.8.1 Stone Placement

Place rock for rip-rap on prepared bedding material to produce a well graded mass with the minimum practicable percentage of voids in conformance with lines and grades indicated. Distribute larger rock fragments, with dimensions extending the full depth of the rip-rap throughout the entire mass and eliminate "pockets" of small rock fragments. Rearrange individual pieces by mechanical equipment or by hand as necessary to obtain the distribution of fragment sizes specified above.

3.9 FINISHING/FINISH OPERATIONS

During construction, keep embankments and excavations shaped and drained. Maintain ditches and drains along subgrade to drain effectively at all times. Do not disturb the finished subgrade by traffic or other operation. Protect and maintain the finished subgrade in a satisfactory condition until ballast, subbase, base, or pavement is placed. Do not permit the storage or stockpiling of materials on finished subgrade. Do not lay subbase, base course, ballast, or pavement until the subgrade has been checked and approved, and in no case place subbase, base, surfacing, pavement, or ballast on a muddy, spongy, frozen or otherwise unstable subgrade.

Finish the surface of excavations, embankments, and subgrades to a smooth and compact surface in accordance with the lines, grades, and cross sections or elevations shown. Provide the degree of finish for graded areas within 0.1 foot of the grades and elevations indicated except as indicated for subgrades specified in paragraph SUBGRADE PREPARATION. Finish gutters and ditches in a manner that will result in effective drainage. Finish the surface of areas to be turfed to a smoothness suitable for the application of turfing materials. Repair graded, topsoiled, or backfilled areas prior to acceptance of the work, and re-established grades to the required elevations and slopes.

3.9.1 Capillary Water Barrier

Place a capillary water barrier under concrete floor and area-way slabs grade directly on the subgrade and compact with a minimum of two passes of a hand-operated plate-type vibratory compactor.

3.9.2 Grading Around Structures

Construct areas within 5 feet outside of each building and structure line true-to-grade, shape to drain, and maintain free of trash and debris until final inspection has been completed and the work has been accepted.

3.9.3 Shoulder Construction

Construct shoulders of (area within 3 feet of pavement) satisfactory material. Submit advanced notice on shoulder construction for rigid pavements. Construct shoulders immediately after adjacent paving is complete. In the case of rigid pavements, do not construct shoulders until permission of the Contracting Officer has been obtained. Compact the entire shoulder area to at least the percentage of maximum dry density as specified in paragraph SUBGRADE PREPARATION above, for specific ranges of depth below the surface of the shoulder. Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment. Finish shoulder construction in proper sequence in such a manner that adjacent ditches will be drained effectively and that no damage of any kind is done to the adjacent completed pavement. Align the completed shoulders true to grade and shaped to drain in conformity with the cross section shown.

3.9.4 Grading

Finish grades as indicated within one-tenth of one foot. Grade areas to drain water away from structures. Maintain areas free of trash and debris. For existing grades that will remain but which were disturbed by

Contractor's operations, grade as directed.

3.9.5 Topsoil and Seed

Provide as specified in RFP Part 3 ESR_G20.

3.10 DISPOSITION OF SURPLUS MATERIAL

Prepare plan for Disposition of Surplus Materials to include permissions document to dispose of nonsalable products. Dispose of surplus soil and material per section 01 57 19 TEMPORARY ENVIRONMENTAL

3.11 TESTING

Perform testing as indicated in Table 1. Submit Material Test Reports within 3 days of tests being completed.

Material Type list materials to be tested as identified in paragraph DEFINITIONS	Location of Material	Test Method	Test Frequency
		Density - ASTM D1556/D1556M, ASTM D2167, ASTM D6938, ASTM D8167/D8167M. When ASTM D6938 or ASTM D8167/D8167M is used, check the calibration curves and adjust using only the sand cone method as described in ASTM D1556/D1556M.	One test per 2000 square feet, or fraction thereof, of each lift of fill or backfill areas compacted by other than hand-operated machines. Double testing frequency for areas compacted by hand-operated machines. If ASTM D6938 or ASTM D8167/D8167M is used, check in-place densities by ASTM D1556/D1556M as follows: One check test per lift for every 10 tests. Where ASTM D8167/D8167M is used, provide water content verification in accordance with ASTM D2216 for each test.
		Moisture Content - ASTM D2216	Two tests per day for each type of fill and backfill. Sample taken immediately prior to compaction after moisture conditioning.

Material Type list materials to be tested as identified in paragraph DEFINITIONS	Location of Material	Test Method	Test Frequency
		Moisture Density Relationship - ASTM D1557	One representative test per 500 cubic yards of fill and backfill, or when any change in material occurs which may affect the optimum moisture content or laboratory maximum dry density. Sample to be taken from stockpile or location of placement.
		Relative Density - ASTM D4253 and ASTM D4254	One test per 2000 square feet, or fraction thereof, of each lift of fill or backfill areas compacted by other than hand-operated machines. Double testing frequency for areas compacted by hand-operated machines.

Material Type list materials to be tested as identified in paragraph DEFINITIONS	Location of Material	Test Method	Test Frequency
		Gradation - ASTM C136/C136M	One representative test per 500 cubic yards of fill and backfill, or when any change in material occurs which may affect the optimum moisture content or laboratory maximum dry density. Sample to be taken from stockpile or location of placement.
		Atterberg Limits - ASTM D4318	One representative test per 500 cubic yards of fill and backfill, or when any change in material occurs which may affect the optimum moisture content or laboratory maximum dry density. Sample to be taken from stockpile or location of placement.

Material Type list materials to be tested as identified in paragraph DEFINITIONS	Location of Material	Test Method	Test Frequency
		Organic Content Test - ASTM D2974, Method C	One representative test per 200 lineal of embankment.

-- End of Section --

SECTION 31 31 16.13

CHEMICAL TERMITE CONTROL
08/22, CHG 1: 11/23

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. DEPARTMENT OF DEFENSE (DOD)

DODI 4150.07 (2019) DOD Pest Management Program

1.2 ADMINISTRATIVE REQUIREMENTS

Coordinate work related to final grades, landscape plantings, foundations, or any other alterations to the finished construction which might alter the condition of treated soils.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Termiticide Application Plan; G

SD-03 Product Data

Termiticides

SD-05 Design Data

Mixing Formulation

SD-06 Test Reports

Soil Moisture

Calibration Test

SD-07 Certificates

Qualifications; G

Foundation Exterior

Utilities and Vents

Crawl and Plenum Air Spaces

List of Equipment

SD-08 Manufacturer's Instructions

Termiticides

SD-11 Closeout Submittals

Verification of Measurement

Warranty

Pest Management Report

1.4 QUALITY CONTROL

1.4.1 Regulatory Requirements

Comply with DODI 4150.07 for requirements on Contractor's licensing, certification, and record keeping. Maintain daily records using the Pest Management Maintenance Record, DD Form 1532-1, or a computer generated equivalent, and submit copies of records when requested by the Contracting Officer. These forms may be obtained from the main web site: https://www.esd.whs.mil/Directives/forms/fmo_poc/

1.4.2 Qualifications

For the application of pesticides, use the services of an applicator whose principal business is pest control. The applicator must be commercially certified in the state where the work is to be performed as required by DODI 4150.07. No contractor personnel may work under the supervision of a certified person even where this is permitted practice in those States or host nations in which the DOD property is located. Termiticide applicators must also be certified in the U.S. Environmental Protection Agency (EPA) pesticide applicator category which includes structural pest control. Submit a copy of the pest control business license and pesticide applicator certificates to the Contracting Officer prior to any applications.

1.4.3 Safety Requirements

Formulate, apply, and dispose of termiticides and their containers in accordance with label directions. Draw water for formulating only from sites designated by the Contracting Officer, and fit the filling hose with a backflow preventer meeting local plumbing codes or standards. Maintain an air gap between the filling hose and tank. Perform filling operations under the direct and continuous observation of a contractor's representative to prevent overflow. Secure pesticides and related materials under lock and key when unattended. Ensure that proper protective clothing and equipment are worn and used during all phases of termiticide application. Dispose of used pesticide containers off Government property.

1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Delivery

Deliver termiticide material to the site in the original unopened

containers bearing legible labels indicating the EPA registration number, manufacturer's registered uses and in new or otherwise good condition as supplied by the manufacturer or formulator.

1.5.2 Inspection

Inspect termiticides upon arrival at the job site for conformity to type and quality in accordance with paragraph TERMITICIDES. Each label must bear evidence of registration under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as amended or under appropriate regulations of the host county. Inspect other materials for conformance with specified requirements. Remove unacceptable materials from the job site.

1.5.3 Storage

Storage of pesticides on the installation will not be permitted unless it is written into the contract.

1.5.4 Handling

Handle and mix termiticides in accordance with the manufacturer's label and SDS, preventing contamination by dirt, water, and organic material. Protect termiticides from weather elements as recommended by the manufacturer's label and SDS. Spill kits must be maintained on pest control vehicles and must be available at the mixing site. Conduct termiticide mixing in an area that has been approved by the Integrated Pest Management Coordinator (IPMC) or Contracting Officer, and with adequate spill containment that can contain at least 110 percent of the volume of the tank.

1.6 SITE CONDITIONS

The following site conditions determine the acceptable time of application.

1.6.1 Soil Moisture

Test soils to be treated immediately before application. Test soil moisture content to a minimum depth of 3 inches. The soil moisture must be as recommended by the termiticide manufacturer. Application of the termiticide is not permitted when soil moisture content exceeds manufacturer's recommendations.

1.6.2 Runoff and Wind Drift

Application of termiticide will not be permitted during or immediately following heavy rains, when conditions may allow runoff, when it may create an environmental hazard or when average wind speed exceeds 10 miles per hour. Termiticide is not permitted to enter water systems, aquifers, or endanger humans or animals.

1.7 WARRANTY

Provide a 5 year written warranty against infestations or reinfestations by subterranean termites of the buildings or building additions constructed under this contract. Include in the warranty annual inspections of the buildings or building additions during the warranty period. If live subterranean termite infestation or subterranean termite damage is discovered during the warranty period, and the soil and building conditions have not been altered in the interim:

a. Re-treat the site and perform other treatment as may be necessary for elimination of subterranean termite infestation;

b. Repair damage caused by termite infestation; and

c. Reinspect the building approximately 180 days after the re-treatment.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

Chemical termite control uses liquid termiticide treatments applied to the soil to form a continuous chemical barrier in the soil around both sides of the foundation. The application can be surface applied or rodded and trenched. This barrier prevents foraging termites from reaching the foundation and piers. Only the soil adjacent to these foundation elements is treated. For slab construction (including foundations, patios and garages), the entire soil (or gravel) surface is treated before the vapor barrier is installed and the slab poured over it. Soil treatment is coordinated with all building activities from foundation construction through final grading of the soil around the building's exterior. In order for the treatment to be effective, the final phase of the application must be done after final grading and sometimes after landscaping is completed so that the treated soil is not disturbed.

2.2 MATERIALS

2.2.1 Termiticides

Provide termiticides currently registered by the EPA or host country. Termiticides must be approved by the Contracting Officer and the Pest Management Consultant prior to use. Select non-repellent termiticides (active ingredient: chlorantraniliprole, chlorfenapyr, fipronil, or imidacloprid) for maximum effectiveness and duration after application. Select a termiticide that is suitable for the soil and climatic conditions at the project site and apply at the highest labeled rate. Submit manufacturer's label and Safety Data Sheet (SDS) for termiticides proposed for use.

PART 3 EXECUTION

3.1 PREPARATION

Before termiticide application begins, remove all cellulose containing materials from the site such as wood debris from clearing and grubbing and post construction wood scraps, such as ground stakes, form boards, cardboard paper, and scrap lumber from the site.

3.1.1 Verification

Before work starts, verify that final grades are as indicated and smooth grading has been completed in accordance with Section 31 00 00 EARTHWORK. Finely grade soil and remove particles larger than 1 inch. Compact soil particles to eliminate soil movement.

3.1.2 Foundation Exterior

If the exterior perimeter treatment is applied before major construction

is completed it will be damaged or removed. The exterior foundation perimeter treatment will have to occur in phases during completion of any pads, porches, aprons, sidewalks, final grading, or landscape plantings adjacent to the building foundation. These treatment areas should be coordinated after all major construction but before any pads, porches, or other items requiring special consideration are poured adjacent to the foundation walls. Submit written verification that final grading, landscape planting, and other items adjacent to the foundation will not disturb treatment of the soil on the exterior sides of foundation walls, grade beams, and similar structures.

3.1.3 Utilities and Vents

Turn off and block HVAC ducts and vents located in the treatment area prior to application to protect people and animals from termiticide. Submit written verification that the HVAC ducts and vents, water and sewer lines, and plumbing have been turned off or blocked prior to applying termiticide.

3.1.4 Crawl and Plenum Air Spaces

Submit written verification that crawl and plenum air spaces have been located and identified prior to applying termiticide.

3.1.5 Application Plan

Prior to commencing application of termiticide, submit a Termiticide Application Plan addressing the following items:

a. proposed sequence of treatment work including dates and times of application

b. termiticide trade name

c. EPA registration number

d. chemical composition

e. concentration of original and diluted material

f. formulation

g. manufacturer's recommended application rates

h. regional requirements

i. application rate of active ingredients

j. method of application

k. area or volume to be treated

l. amount to be applied

m. copy of the pest control business license

n. copy of the pesticide applicator certificates

3.2 APPLICATION

For areas to be treated, establish complete and unbroken vertical and horizontal soil chemical barriers between the soil and all portions of the intended structure which may allow termite access to wood and wood related products. Make applications to crawl spaces in accordance with label directions. Applications to crawl space areas that are used as plenum air spaces will not be permitted.

3.2.1 Equipment Calibration and Tank Measurement

Submit a list of equipment to be used. Conduct calibration test on the application equipment to be used immediately prior to commencement of termiticide application. Measure the volume and contents of the application tank. Testing must confirm that the application equipment is operating within the manufacturer's specifications and meets the specified requirements. Submit written certification of the equipment calibration test results within one week of testing. Where results from the equipment calibration and tank measurements tests are unsatisfactory, re-treatment will be required.

3.2.2 Mixing and Application

Perform all work related to formulating, mixing, and application in the presence of the Contracting Officer, a DOD certified pesticide applicator, Pest Management Quality Assurance Evaluator (QAE)/Performance Assessment Representative (PAR), or IPMC. Applications must be made at the highest rate or concentration allowed by the label. Submit mixing formulation:

a. Quantity of pesticide used.

b. Rate of dispersion.

c. Percent of use.

d. Total amount used.

A closed system is recommended as it prevents the termiticide from coming into contact with the applicator or other persons. Only use water from designated locations. Fit filling hoses with a backflow preventer meeting local plumbing codes or standards. Maintain an air gap between filling hoses and tanks. Prevent overflow during the filling operation. Spill kits must be maintained on pest control vehicles and must be available at the mixing site. Termiticide mixing must be conducted in an area that has been designated by the IPMC or Contracting Officer and that has adequate spill containment. Inspect the application equipment prior to each day of use for leaks, clogging, wear, or damage. Immediately perform repairs on the application equipment to prevent or eliminate leaks and clogging.

3.2.2.1 Application Method

3.2.2.1.1 Surface Application

Use surface applications for establishing horizontal barriers. Apply termiticide as a coarse spray and provide uniform distribution over the soil surface. Termiticide must penetrate a minimum of 1 inch into the soil, or as recommended by the manufacturer. If soils are treated to a depth less than specified or approved, repeat work performed to the depth specified at no additional cost to the Government.

3.2.2.1.2 Rodding and Trenching

Use rodding and trenching for establishing vertical soil barriers. Trenching must be to the depth of the foundation footing. Width of trench must be as recommended by the manufacturer, or as indicated. Rodding or other approved method may be implemented for saturating the base of the trench with termiticide. Backfill the trench immediately after termiticide has reached maximum penetration as recommended by the manufacturer. If maximum penetration is not achieved, as recommended by the manufacturer, repeat work performed to maximum penetration as recommended by the manufacturer at no additional cost to the Government. Backfill in 6 inch rises or layers. Treat each rise or layer with termiticide.

3.2.3 Sampling

The Contracting Officer may draw samples for analysis, at any time and without prior notice, from stocks at the job site to determine if the amount of active ingredient specified on the label is being applied. When analysis, performed by the Government, indicates samples contain less than the amount of active ingredient specified on the label, repeat work performed with pesticides conforming to this specification at no additional cost to the Government.

3.2.4 Vapor Barriers and Waterproof Membranes

Apply termiticide prior to placement of a vapor barrier or waterproof membrane.

3.2.5 Placement of Concrete

Place concrete covering treated soils after the termiticide has reached maximum penetration into the soil as recommended by the manufacturer. Cover treated areas with plastic if slab is not to be poured immediately following termiticide application.

3.2.6 Clean Up, Disposal, and Protection

Once application has been completed, proceed with clean up and protection of the site without delay.

3.2.6.1 Clean Up

Clean the site of all material associated with the treatment according to label instructions, and as indicated. Remove and dispose of excess and waste material off Government property.

3.2.6.2 Disposal of Termiticide

Dispose of residual termiticides and containers off Government property, and in accordance with label instructions and EPA criteria.

3.3 FIELD QUALITY CONTROL

3.3.1 Verification of Measurement

Once termiticide application has been completed, measure tank contents to determine the remaining volume. The total volume measurement of used

contents for the application must equal the application rate established in the application plan. Submit written verification that the volume of termiticide used meets the application rate established in the application plan.

3.3.2 Inspection

3.3.2.1 Technical Representative

Provide a technical representative who is a DOD certified pesticide applicator, Pest Management QAE/PAR, or IPMC. The technical representative must be present at all meetings concerning treatment measures for subterranean termites and during treatment application. Contact the IPMC prior to starting work.

3.4 CLOSEOUT ACTIVITIES

Upon completion of this work, submit the Pest Management Report DD Form 1532, or an equivalent computer product, to the IPMC. This form identifies the target pest, type of operation, brand name and manufacturer of pesticide, formulation, concentration or rate of application used.

3.5 PROTECTION

3.5.1 Protection of Treated Area

Immediately after the application, protect the area from other use by erecting barricades as required or directed. Provide signage in accordance with Section 10 14 00.10 EXTERIOR SIGNAGE. Place signage inside the entrances to crawl spaces and identify the space as treated with termiticide and not safe for children or animals.

3.5.2 Disturbance of Treated Soils

Re-treat soil and fill material disturbed after treatment before placement of slabs or other covering structures.

-- End of Section --

SECTION 33 82 00

TELECOMMUNICATIONS OUTSIDE PLANT (OSP)
04/06

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 B1	(2013) Standard Specification for Hard-Drawn Copper Wire
ASTM B8	(2023) Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM D709	(2017) Standard Specification for Laminated Thermosetting Materials
ASTM D1557	(2012; E 2015) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3) (2700 kN-m/m3)

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 100	(2000; Archived) The Authoritative Dictionary of IEEE Standards Terms
IEEE C2	(2023) National Electrical Safety Code

INSULATED CABLE ENGINEERS ASSOCIATION (ICEA)

ICEA S-87-640	(2023) Optical Fiber Outside Plant Communications Cable; 4th Edition
ICEA S-98-688	(2012) Broadband Twisted Pair Telecommunication Cable, Aircore, Polyolefin Insulated, Copper Conductors Technical Requirements
ICEA S-99-689	(2012) Broadband Twisted Pair Telecommunication 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	(2023; ERTA 1 2024; TIA 24-1; TIA 25-2) National Electrical Code

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC SP 6/NACE No.3	(2007) Commercial Blast Cleaning

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)

ANSI/TIA-526-7	(2015a; R 2022) Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant, Adoption of IEC 61280-4-2 edition 2: Fibre-Optic Communications Subsystem Test Procedures - Part 4-2: Installed Cable Plant - Single-Mode Attenuation and Optical Return Loss Measurement
ANSI/TIA-526-14	(2023d) OFSTP-14A Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant
ANSI/TIA-568.1	(2020e) Commercial Building Telecommunications Infrastructure Standard
ANSI/TIA-568.2	(2024e) Balanced Twisted-Pair Telecommunications Cabling and Components Standards
ANSI/TIA-568.3	(2022e) Optical Fiber Cabling Components Standard
ANSI/TIA-569	(2019e; Add 1 2022) Telecommunications Pathways and Spaces
ANSI/TIA-606	(2021d) Administration Standard for Telecommunications Infrastructure
ANSI/TIA-607	(2019d) Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises
TIA-455-78-B	(2020c; R 2024) FOTP-78 Optical Fibres - Part 1-40: Measurement Methods and Test Procedures - Attenuation
TIA-455-107	(1999a) FOTP-107 Determination of Component Reflectance or Link/System Return Loss using a Loss Test Set
TIA-492CAAA	(1998; R 2002) Detail Specification for Class IVa Dispersion-Unshifted Single-Mode Optical Fibers
TIA-492E000	(1996; R 2002) Sectional Specification for Class IVd Nonzero-Dispersion Single-Mode Optical Fibers for the 1550 nm Window

TIA-590	(1997a) Standard for Physical Location and Protection of Below Ground Fiber Optic Cable Plant
TIA-758	(2012b) Customer-Owned Outside Plant Telecommunications Infrastructure Standard
TIA/EIA-455	(1998b) Standard Test Procedure for Fiber Optic Fibers, Cables, Transducers, Sensors, Connecting and Terminating Devices, and Other Fiber Optic Components
TIA/EIA-455-204	(2024b) Standard for Measurement of Bandwidth on Multimode Fiber
TIA/EIA-598	(2014D; Add 2 2018) Optical Fiber Cable Color Coding

U.S. DEPARTMENT OF AGRICULTURE (USDA)

RUS 1755	Telecommunications Standards and Specifications for Materials, Equipment and Construction
RUS Bull 345-65	(1985) Shield Bonding Connectors (PE-65)
RUS Bull 345-83	(1979; Rev Oct 1982) Gas Tube Surge Arrestors (PE-80)
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)

UL SOLUTIONS (UL)

UL 83	(2017; Reprint Mar 2020) UL Standard for Safety Thermoplastic-Insulated Wires and Cables
UL 497	(2001; Reprint Jul 2022) UL Standard for Safety Protectors for Paired Conductor Communication Circuits
UL 510	(2020; Dec 2022) UL Standard for Safety Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape

1.2 RELATED REQUIREMENTS

Section 27 10 00, BUILDING TELECOMMUNICATIONS CABLING SYSTEM and Section 33 71 02, 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 ANSI/TIA-568.1, ANSI/TIA-568.2, ANSI/TIA-568.3, ANSI/TIA-569, ANSI/TIA-606, 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) (Telecommunications)

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 the NMCI contractor 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 the NMCI contractor.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Telecommunications Outside Plant; G

Telecommunications Entrance Facility Drawings; G

In addition to Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES, provide shop drawings in accordance with paragraph SHOP DRAWINGS.

SD-03 Product Data

Wire and Cable; G

Cable Splices, and Connectors; G

Building Protector Assemblies; G

Protector Modules; G

Spare Parts; G

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 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES.

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

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 and as specified herein not later than 2 months prior to the date of beneficial occupancy. In addition to requirements of Data package 5, include the requirements of paragraphs TELECOMMUNICATIONS OUTSIDE PLANT SHOP DRAWINGS and TELECOMMUNICATIONS ENTRANCE FACILITY DRAWINGS.

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 RUS Bull 1751F-643 for underground 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 ANSI/TIA-606. 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 ANSI/TIA-606. 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 ANSI/TIA-606 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 incoming cable stub or connector blocks, building protector assembly, outgoing 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 TELECOMMUNICATIONS SPACE DRAWINGS of Section 27 10 00 BUILDING TELECOMMUNICATIONS CABLING SYSTEMS. 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 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, ANSI/TIA-568.1, ANSI/TIA-568.2 and ANSI/TIA-568.3. 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 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 ANSI/TIA-568.1 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 2 years prior to bid opening. The 2-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, manufacturers' catalogs, or brochures during the 2-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 2-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturers' 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 500 feet length with a minimum overage of 10 percent. 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 T5 drawings including documentation on cables and termination hardware in accordance with ANSI/TIA-606. T5 drawings shall include schedules to show information for cut-overs and cable plant management, patch panel layouts, cross-connect information and connecting terminal layout as a minimum. T5 drawings shall be provided in 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 ANSI/TIA-606. The cable records shall include 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 in accordance with ANSI/TIA-606. 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 ANSI/TIA-606. Documentation shall include in accordance with ANSI/TIA-606.

Provide record documentation as specified in Section 27 10 00 BUILDING TELECOMMUNICATIONS CABLING SYSTEM.

1.8.2 Spare Parts

In addition to the requirements of Section 01 78 23 OPERATION AND MAINTENANCE DATA, 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

Provide self-contained 5 pin unit supplied with a field cable stub factory connected to protector socket blocks to terminate and accept protector modules for pairs of outside cable. Building protector assembly shall have interconnecting hardware for connection to interior 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 or maximum duty, A>20kA, B>1000, C>200A 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 27 10 00 BUILDING TELECOMMUNICATIONS CABLING SYSTEM.

2.3 CABLE SPLICES, AND CONNECTORS

2.3.1 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-B 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-455-107. Physically protect each fiber optic splice by a splice kit specially designed for the splice.

2.3.2 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 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.

2.3.3 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.

2.4 CONDUIT

Provide conduit as specified in Section 33 71 02 UNDERGROUND ELECTRICAL DISTRIBUTION.

2.5 PLASTIC INSULATING TAPE

UL 510.

2.6 WIRE AND CABLE

2.6.1 Fiber Optic Cable

Provide single-mode, 8/125-um, 0.10 aperture 1310 nm fiber optic cable in accordance with TIA-492CAAA single-mode, 8/125-um, 0.10 aperture 1550 nm fiber optic cable in accordance with TIA-492E000. Provide optical fibers as indicated. Fiber optic cable shall be specifically designed for outside use with loose buffer construction. Provide fiber optic color code in accordance with TIA/EIA-598

2.6.1.1 Strength Members

Provide central 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.

2.6.1.2 Performance Requirements

Provide fiber optic cable with optical and mechanical performance requirements in accordance with ICEA S-87-640.

2.6.2 Grounding and Bonding Conductors

Provide grounding and bonding conductors in accordance with RUS 1755.200, ANSI/TIA-607, IEEE C2, and NFPA 70. Solid bare copper wire meeting the

requirements of ASTM B1 for sizes No. 8 AWG and smaller and stranded bare copper wire meeting the requirements of ASTM B8, for sizes No. 6 AWG and larger. Insulated conductors shall have 600-volt, Type TW insulation meeting the requirements of UL 83.

2.7 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 ANSI/TIA-606. Handwritten labeling is unacceptable.

2.7.1 Stainless Steel

Provide stainless steel, cable tags 1 5/8 inches in diameter 1/16 inch thick minimum, and circular in shape. Tags shall be die stamped with numbers, letters, and symbols not less than 0.25 inch high and approximately 0.015 inch deep in normal block style.

2.7.2 Polyethylene Cable Tags

Provide tags of polyethylene that have an average tensile strength of 3250 pounds per square inch; and that are 0.08 inch thick (minimum), non-corrosive non-conductive; resistive to acids, alkalis, organic solvents, and salt water; and distortion resistant to 170 degrees F. Provide 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 175 pounds. The cable tags shall have black block letters, numbers, and symbols one inch high on a yellow background. Letters, numbers, and symbols shall not fall off or change positions regardless of the cable tags' orientation.

2.8 BURIED WARNING AND IDENTIFICATION TAPE

Provide fiber optic media marking and protection in accordance with TIA-590. Provide color, type and depth of tape as specified in paragraph BURIED WARNING AND IDENTIFICATION TAPE in Section 31 00 00, EARTHWORK.

2.9 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.

2.10 FIELD FABRICATED NAMEPLATES

Provide laminated plastic nameplates in accordance with ASTM D709 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, 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.

2.11 TESTS, INSPECTIONS, AND VERIFICATIONS

2.11.1 Factory Reel Test Data

Test 100 percent OTDR test of FO media at the factory in accordance with ANSI/TIA-568.1 and ANSI/TIA-568.3. Use ANSI/TIA-526-7 for single mode fiber and ANSI/TIA-526-14 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 24 inches below finished grade. Trenches shall be not less than 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 36 inches. Where two or more cables are laid parallel in the same trench, space laterally at least 3 inches apart. When rock is encountered, remove it to a depth of at least 3 inches below the cable and fill the space with sand or clean earth free from particles larger than 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 warning tape as specified in paragraph BURIED WARNING AND IDENTIFICATION TAPE in Section 31 00 00 EARTHWORK.

3.1.3.1 Cable Placement

a. Separate cables crossing other cables or metal piping from the other cables or pipe by not less than 3 inches of well tamped earth. Do not install circuits for communications under or above traffic signal loops.

b. Cables shall be in one piece without splices between connections except where the distance exceeds the lengths in which the cable is furnished.

c. 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.

d. Leave a horizontal slack of approximately 3 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 aboveground, leave additional slack to make necessary connections.

3.1.3.2 Identification Slabs 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 metal shall be used.

3.1.4 Cable Protection

Provide direct burial cable protection in accordance with NFPA 70 and as specified in Section 33 71 02 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 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 percent of cross-sectional area, or in concrete encased 4 inches PVC pipe. Conduit may be installed by jacking or trenching. Trenches shall be backfilled with earth and mechanically tamped at 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, and existing ducts as specified in Section 33 71 02 UNDERGROUND ELECTRICAL DISTRIBUTION with any additional requirements as specified herein.

3.1.6 Reconditioning of Surfaces

Provide reconditioning of surfaces as specified in Section 33 71 02 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 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 Cable Splicing

3.1.9.1 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.

3.1.9.2 Fiber Optic Splices

Fiber optic splicing shall be in accordance with manufacturer's recommendation and shall exhibit an insertion loss not greater than 0.2 dB for fusion splices.

3.1.10 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.

3.1.11 Grounding

Provide grounding and bonding in accordance with RUS 1755.200, ANSI/TIA-607, IEEE C2, and NFPA 70. Ground exposed noncurrent carrying metallic parts of telephone equipment, cable sheaths, cable splices, and terminals.

3.1.11.1 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 Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM.

3.1.11.2 Incoming Cable Shields

Shields shall not be bonded across the splice to the cable stubs. Ground shields of incoming cables in the EF Telecommunications to the TMGB.

3.1.11.3 Campus Distributor Grounding

a. Protection assemblies: Mount CD protector assemblies directly on the telecommunications backboard in the telecommunications rack,cabinet. Connect assemblies mounted on each vertical frame with No. 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.

3.1.12 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 ANSI/TIA-606. Handwritten labeling is unacceptable. Stenciled lettering for cable and termination hardware shall be provided using thermal ink transfer process, 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 only new wire and cable provided by this contract. 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 ANSI/TIA-606. 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 ANSI/TIA-606.

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 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 at least 10 percent of the 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 at least 10 percent 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. 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

3.5.2.2 Fiber Optic Cable

Test fiber optic cable in accordance with TIA/EIA-455 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.

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, 66 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 ANSI/TIA-526-7 for single-mode fiber and ANSI/TIA-526-14 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, 1310, 1550 nanometer light source 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 ANSI/TIA-526-7 for single-mode fiber optic cables. The measurement method shall be in accordance with TIA-455-78-B. 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/EIA-455-204.

3.5.3 Soil Density Tests

a. Determine soil-density relationships for compaction of backfill material in accordance with ASTM D1557, Method D.

b. Determine soil-density relationships as specified for soil tests in Section 31 00 00 EARTHWORK.

-- End of Section --