



eProjects No: 1702359
Appropriation: MCON

**DESIGN-BUILD RFP FOR THE
COMPOSITE SHOP**

at the

Naval Station Norfolk, Virginia

(P-1127U)

SUBMITTED BY:

NAVFAC MID-ATLANTIC
Public Works Department Norfolk
Facilities Engineering and Acquisition Division
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For Commander, NAVFAC MID-ATLANTIC:

Date:

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PRICE PROPOSAL FORM**FY22 MCON PROJECT P-1127U CMV 22B COMPOSITE SHOP**

<u>CLIN</u>	<u>TOTAL PRICE</u>
0001AA	_____

<u>CLIN</u>	<u>QUANTITY</u>	<u>UNIT</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
0001AB	500	CY	_____	_____
0001AC	50	TONS	_____	_____
0001AD	50	TONS	_____	_____

TOTAL FOR CLIN 0001 (CLINS 0001AA – CLINS 0001AD)	_____
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<u>CLIN</u>	<u>GOV'T EST</u>	<u>HAR%</u>	<u>HAR AMOUNT</u>	<u>TOTAL PRICE</u>
0002	\$207,347	_____	_____	_____

TOTAL FOR CLIN 0002	_____
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TOTAL FOR CLIN 0001 AND CLIN 0002	_____
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DOCUMENT 00 22 13.00 20

SUPPLEMENTARY INSTRUCTIONS TO OFFERORS
02/14

PART 1 GENERAL

1.1 CONTRACT LINE ITEMS

The terms Offeror and Bidder and versions thereof (offer/bid) have the same definition as used within this contract.

Provide the Contract Line Item (CLIN) price for the following items:

CLIN 0001 - BASE PRICE. Price includes the following:

CLIN 0001AA. Price for the entire work in accordance with the drawings and specifications, but excluding work described in Contract Line Item (CLIN) **0001AB, 0001AC, 0001AD, and 0002.**

CLIN	DESCRIPTION	TOTAL PRICE FOR CLIN 0001AA
0001AA	Price for the entire work in accordance with the drawings and specifications, but excluding work described in Contract Line Item (CLIN) 0001AB, 0001AC, 0001AD, and 0002.	\$ _____

CLIN 0001AB. Price for undercut and disposal of geotechnically unsuitable subgrade soils and replacement with imported structural fill material within general building and pavement limits, complete, in accordance with the drawings and specifications and in accordance with the following schedule:

Basis of Bid for CLIN **0001AB** shall be the Total Amount for CLIN **0001AB**, but excluding work described in Contract Line Item (CLIN) **0001AA, 0001AC, 0001AD, and 0002.**

CLIN	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE FOR CLIN 0001AB
0001AB	Undercut of Geotechnically Unsuitable Subgrade Soils and Replacement with Imported Structural Fill material	500	Cubic Yards	\$ _____	\$ _____

Unit price for all work in connection with the removal, disposal, and replacement of geotechnically unsuitable subgrade soil (i.e. soft subgrade soils) with imported structural backfill or imported aggregate as specified. Unsuitable subgrade soil determinations shall be made by the Government Geotechnical Engineer and approved by the Contracting Officer. The price shall include removal of geotechnically unsuitable soils encountered at the planned footing subgrades or identified during proofrolling of planned subgrades, disposal at the specified disposal facility, and backfilling the excavation with compacted imported structural backfill or imported aggregate. Work excludes base bid excavation and imported structural backfill specified elsewhere in the RFP. Soils disturbed by the contractor's construction activities, or that are excessively wet and soft due to lack of proper site maintenance and protection measures, and lack of specified drainage or excavation dewatering will not be considered unsuitable. Unit price shall include all handling and transportation. The volume of material removed and imported backfill required shall be neat quantities determined based on field measurements (length x width x depth) of the completed excavation to remove the unsuitable soil as approved by the Contracting Officer. Any work under these CLIN's will not proceed without prior written approval of the Contracting Officer and direction of the Government Geotechnical Engineer.

CLIN 0001AC. Price for demolition, excavation and disposal of buried concrete and debris greater than 1 cubic yard in size, encountered within planned excavation limits and not identified in the Contract Documents, complete, in accordance with the drawings and specifications and in accordance with the following schedule:

Basis of Bid for CLIN **0001AC** shall be the Total Amount for CLIN **0001AC**, but excluding work described in Contract Line Item (CLIN) **0001AA, 0001AB, 0001AD, and 0002.**

CLIN	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE FOR CLIN 0001AC
0001AC	Demolition, excavation and disposal of buried concrete and debris greater than 1 cubic yard in size	50	Tons	\$_____	\$_____

Unit price for providing demolition and excavation of buried concrete and debris that is encountered within planned excavation limits and not identified in the Contract Documents for demolition, greater than 1 cubic yard in size. Buried concrete and debris meeting the specified criteria will be field verified by the Contracting Officer prior to removal and will be segregated from the surrounding soil during demolition and excavation operations. Pieces of buried concrete and debris encountered within the planned excavation limits smaller than 1 cubic yard in size shall be considered to be incidental to the work. Unit price shall include all work in connection with buried concrete and debris removal and disposal and refilling of over excavation with clean imported structural backfill. Unit price shall include removal and disposal of buried concrete and debris encountered within planned excavations at a permitted licensed disposal facility and backfilling any over excavation with compacted clean imported structural backfill or other material specified. Unit price shall include handling and transportation. The volume of buried concrete and debris removed will be based on certified truck scale

measurement and the quantity will be approved by the Contracting Officer. Any work under this CLIN will not proceed without prior written approval and field verification from the Contracting Officer.

CLIN 0001AD. Price for excavation, handling, storage, sampling, analysis and disposal of petroleum contaminated soil at a permitted licensed facility, complete, in accordance with the drawings and specifications and in accordance with the following schedule:

Basis of Bid for CLIN **0001AD** shall be the Total Amount for CLIN **0001AD**, but excluding work described in Contract Line Item (CLIN) **0001AA, 0001AB, 0001AC, and 0002.**

CLIN	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE FOR CLIN 0001AD
0001AD	Excavation, handling, storage, sampling, analysis and disposal of petroleum contaminated soil at a permitted licensed facility	50	Tons	\$_____	\$_____

Unit price for providing all work in connection with excavation, handling, storage, sampling, analysis and disposal of petroleum contaminated soil at a permitted licensed facility. Sampling shall consist of one composite soil sample (obtained by combining and homogenizing a minimum of three smaller samples from representative sampling points) for each 200 loose cubic yards of material. Soil samples shall be analyzed for Total Petroleum Hydrocarbons (TPH) diesel range and gasoline range organics (DRO & GRO), and Benzene, Toluene, Methylbenzene, and Xylenes (BTEX), plus any other analyses required by the Contractor's selected treatment/disposal facility. Unit price shall include all work in connection with petroleum contaminated soil removal and disposal and replacement with clean imported structural backfill. Unit price shall include removal, treatment, and disposal of petroleum contaminated soils encountered within planned excavations at a permitted licensed treatment/disposal facility and backfilling the excavation with compacted clean imported structural backfill. Unit price shall include handling and transportation. The volume of petroleum contaminated soil removed will be based on certified truck scale measurement and the quantity will be approved by the Contracting Officer. Any work under this CLIN will not proceed without prior written approval and field verification from the Contracting Officer.

CLIN 0002 – Planned Modification. Price includes the following:

Price to procure and supervise installation of the Furniture, Fixtures, and Equipment (FF&E) complete in accordance with the plans and specifications and in accordance with the following schedule:

CLIN	ITEM	GOVERNMENT FF&E ESTIMATE	HAR (NTE 5%)	HAR AMOUNT (GOV'T FF&E ESTIMATE X HAR%)	TOTAL FF&E ESTIMATED AMOUNT FOR CLIN 0002 (GOV'T FF&E ESTIMATE + HAR AMOUNT)
0002	FF&E	\$207,347	_____	\$_____	\$_____

Procurement and installation, including all labor, material, equipment, transportation, and supervision required for the Furniture, Fixtures, and Equipment (FF&E). This line item will include all FF&E in this project except the following; whiteboard and tackboard in Room 101, Air Compressor in Room 103, Eye Wash/Shower in Rooms 110, 111, and 112, and Paint Booth in Room 113. These items are considered systems associated with the Building and their costs shall be included as part of CLIN **0001**.

1.2 GENERAL BID NOTES

- a. Award will be made on the total sum of Contract Line Items **0001 and 0002**.
- b. The Government may reject an offer as nonresponsive if it is materially unbalanced as to prices for the basic requirement and the quantities. An offer is unbalanced when it is based on prices significantly less than cost for some work and prices which are significantly overstated for other work.

1.3 PLANNED MODIFICATION BID NOTES

These notes apply to Planned Modification CLIN **0002**.

- a. The estimated amount for FF&E has been supplied by the Government, to provide offerors with the projected magnitude of effort. The estimated amount includes the actual cost of the FF&E including freight and installation charges. The Government FF&E Estimate is only an estimated amount.

- b. If awarded, line items will be funded separately after completion of FF&E design package review by the Government, and receipt of appropriate funding by the Government. Requirements and details are provided Part 3 ESR E20, Furnishings of the RFP.
- c. Bonding is not required for the design, procurement and installation of FF&E equipment
- d. Offerors may propose a Handling and Administration Rate (HAR) for the FF&E 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 FF&E. 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
- e. The Government is not obligated to award the Planned Modification line item. Should the Government choose to award the Planned Modification, the line item will be awarded as a negotiated modification to the contract/task order. The Contractor's proposed HAR will be applied to all vendor/supplier costs for the FF&E.
- f. The FF&E modification will be awarded at least six months prior to the contract completion date. A minimum of six months is required for the Contractor to purchase, deliver and install the FF&E and A/V without impacting the overall completion date of the project. The Contractor's schedule must assume the award of the FF&E as a modification. No schedule extensions will be granted if the modification is awarded at least six months prior to the contract completion date. If the Government decides to negotiate and award the furniture modification with less than six months prior to the contract completion date, the Contractor may be entitled to a contract extension and extended field overhead. A contract extension and extended field overhead will only be granted in those cases where the Contractor demonstrates that an accepted Final FF&E package was submitted within the approved schedule deadlines and sufficient lead time for the FF&E is not available and the Government's award of the modification is in the last six months of the contract
- g. Upon Government approval of the Best Value Determination (BVD) Analysis solicitation package, a BVD will be made and will be the rationale for selecting the FF&E vendors for the project. Accordingly, the prices provided by the selected vendors, using predominately negotiated price schedules from BPA, GSA, or other Federal contracts, will be the basis for the actual cost of the Final FF&E Package. The actual total cost of the accepted Final FF&E Package plus the HAR rate applied to the total of the Final FF&E Package will determine the total cost. These costs will be compared to the cost provided for CLIN **0002** and adjusted accordingly (ie, money owed to Gov't or money owed to Contractor).

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

PART TWO - GENERAL REQUIREMENTS

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SECTION 01 14 00

WORK RESTRICTIONS
11/11, CHG 13: 08/21

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" classification. Submittals not having a "G" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

List of Contact Personnel

1.2 SPECIAL SCHEDULING REQUIREMENTS

- a. Have materials, equipment, and personnel required to perform the work at the site prior to the commencement of the work. Specific items of work to which this requirement applies include:
- b. Building SP-300 and SP-302 will remain in operation during the entire construction period. The Contractor must conduct his operations so as to cause the least possible interference with normal operations of the activity.
- c. Permission to interrupt any Activity roads or utility service must be requested in writing a minimum of 15 calendar days prior to the desired date of interruption.

1.3 CONTRACTOR ACCESS AND USE OF PREMISES

1.3.1 Activity Regulations

Ensure that Contractor personnel employed on the Activity become familiar with and obey Activity regulations 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, include delivery vehicles, are clearly identified with their company name.

1.3.1.1 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.

1.3.1.2 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.cnmc.navy.mil/om/dbids.html>. No fees are associated with obtaining a DBIDS credential.

1.3.1.2.1 Registration for DBIDS

Registration for DBIDS is available at <https://www.cnmc.navy.mil/om/dbids.html>. 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.cnmc.navy.mil/om/dbids.html>.
- 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.

1.3.1.2.2 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.

1.3.1.2.3 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.

1.3.1.2.4 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.

1.3.1.3 NCACS Identification Badges and Installation Access

Application for and use of badges will be as directed. Obtain access to the installation by participating in the Navy Commercial Access Control System (NCACS), or by obtaining passes each day from the Base Pass and Identification Office. Costs for obtaining passes through the NCACS are the responsibility of the Contractor. One-day passes, issued through the Base Pass and Identification Office, will be furnished without charge. Furnish a completed EMPLOYMENT ELIGIBILITY VERIFICATION (DHS FORM I-9) form for all personnel requesting badges. This form is available at <http://www.uscis.gov/portal/site/uscis> by searching or selecting Employment Verification (Form I-9). Immediately report instances of lost or stolen badges to the Contracting Officer.

- a. NCACS Program: NCACS is a voluntary program in which Contractor personnel who enroll, and are approved, are subsequently granted access to the installation for a period up to one year, or the length of the contract, whichever is less, and are not required to obtain a new pass from the Base Pass and Identification Office for each visit. The Government performs background screening and credentialing. Throughout the year the Contractor employee will continue to meet background screening standards. Periodic background screenings are conducted to verify continued NCACS participation and installation access privileges. Under the NCACS program, no commercial vehicle inspection is required, other than for Random Anti-Terrorism Measures (RAM) or in the case of an elevation of Force Protection Conditions (FPCON). Information on costs and requirements to participate and enroll in NCACS is available at <http://www.rapidgate.com> or by calling 1-877-727-4342. Contractors should be aware that the costs incurred to obtain NCACS credentials, or costs related to any means of access to a Navy Installation, are not reimbursable. Any time invested, or price(s) paid, for obtaining NCACS credentials will not be compensated in any way or approved as a direct cost of any contract with the Department of the Navy.
- b. One-Day Passes: Participation in the NCACS is not mandatory, and if the Contractor chooses to not participate, the Contractor's personnel will have to obtain daily passes, be subject to daily mandatory vehicle inspection, and will have limited access to the installation. The Government will not be responsible for any cost or lost time associated with obtaining daily passes or added vehicle inspections incurred by non-participants in the NCACS.

1.3.1.4 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.

1.3.2 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.

1.3.3 Work Outside Regular Hours

Work outside regular working hours requires Contracting Officer approval. Make application 15 calendar days prior to such work to allow arrangements to be made by the Government 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 a manner approved by the Contracting Officer. Make utility cutovers after normal working hours or on Saturdays, Sundays, and Government holidays unless directed otherwise.

1.3.4 Occupied Buildings

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

1.3.5 Utility Cutovers and Interruptions

- a. Make utility cutovers and interruptions after normal working hours or on Saturdays, Sundays, and Government holidays. Conform to procedures required in paragraph WORK OUTSIDE REGULAR HOURS.
- b. Ensure that new utility lines are complete, except for the connection, before interrupting existing service.
- c. Interruption to water, sanitary sewer, storm sewer, telephone service, electric service, air conditioning, heating, fire alarm, compressed air, and natural gas are considered utility cutovers pursuant to the paragraph WORK OUTSIDE REGULAR HOURS.
- d. Operation of Station Utilities: The Contractor must not operate nor disturb the setting of control devices in the station utilities system, including water, sewer, electrical, and steam services. The Government will operate the control devices as required for normal conduct of the work. The Contractor must 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 Utility Connection Permit prior to connection and in accordance with Section 33 30 00 SANITARY SEWERAGE.

1.4 SECURITY REQUIREMENTS

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

1.4.1 Naval Base, Norfolk, VA

- a. Contractor registration. Register with the Base Police Truck Investigation Team, located behind pass and ID Office (Bldg CD-9) on Hampton Boulevard, Naval Air Station, Norfolk, VA 23511-5000, telephone number (757) 322-2979.
- b. Storage and office trailer registration. Register storage and office trailers to be used on base with the truck investigation team. Trailers must meet State law requirements and must be in good condition.
 - (1) Trailers must be lockable and must be locked when not in use.
 - (2) Trailers must have a sign in the lower left hand corner of left door of trailer with the following information: Company name, address, registration number of trailer or vehicle identification number, location on base, duration of contract or stay on base, contract number, local on-base phone number, off-base phone number of main office, and emergency recall person and phone number.
- c. Equipment markings. Equipment owned or rented by the company must have the company name painted or stenciled on the equipment in a conspicuous location. Rented equipment is to be conspicuously marked with a tag showing who rented the equipment. Register the equipment with the truck investigation team.
- d. Procedure information. For additional information regarding registration procedures, contact the Officer in Charge of Construction at (757) 445-1463 or Base Police at (757) 444-8856.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

-- End of Section --

SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

11/20, CHG 2: 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.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EP 1110-1-8 (2016) Construction Equipment Ownership
and Operating Expense Schedule

1.2 SUBMITTALS

Government approval is required for submittals with a "G" classification. Submittals not having a "G" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 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 a 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. 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 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 Section 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR 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. The requests for payment shall include the documents listed below.

- 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 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

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.

1.6 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 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.

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, including completed preparatory work, 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. 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 and that the title requirements of the clause at FAR 52.232-5 Payments Under Fixed-Price Construction Contracts have been met.
- d. Materials are adequately insured and protected from theft and exposure.
- e. Provide a written consent from the surety company with each payment request for offsite materials.
- f. 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.
- g. 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 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.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (2014) Safety and Health Requirements Manual

1.2 SUBMITTALS

Government approval is required for submittals with a "G" classification. Submittals not having a "G" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

View Location Map

Progress and Completion Pictures

Design Submittal Packaging

Performance Assessment Plan (PAP)

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. 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 two sets of digital photographs, each set on a separate compact disc (CD) or data versatile disc (DVD), 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 on the CD or DVD 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 State 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 for 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 meeting must take place within 35 calendar days after award of the contract, but prior to commencement of any work at the site. 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, schedule of prices or 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.
- 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, eOMS 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 the Concept Design Workshop as established in UFGS 01 31 19.05 20 CONCEPT DESIGN WORKSHOP (CDW).

- j. 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, and the DQC Manager. 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.

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 NRZ 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

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 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 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. 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

Contractor shall 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 19.05 20

CONCEPT DESIGN WORKSHOP (CDW)

02/21

PART 1 GENERAL

1.1 SUMMARY

This document includes post-award requirements for the concept design workshop.

1.2 SUBMITTALS

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

SD-01 Preconstruction Submittals

CDW Facilitator Experience Resume; G

CDW Preliminary Concept Design; G

CDW Report; G

1.3 CONCEPT DESIGN WORKSHOP (CDW)

Provide a CONCEPT DESIGN WORKSHOP that meets the following requirements:

1.3.1 CDW General Requirements

- a. Methodology. Conduct a CDW for this project. This effort will examine programmatic functions, review project requirements, ensure life and operational safety requirements are met, analyze alternate design concepts, expose and resolve project issues, and develop the final conceptual design.
- b. Facilitator. Provide a Facilitator who is experienced in conducting Concept Design Workshops. Submit a CDW Facilitator Experience Resume to the Contracting Officer describing experience with facilitation including a minimum of three examples. He or she will be responsible for leading the team in a timely manner, making sure issues are addressed and resolved during the CDW, documenting meetings held throughout the CDW, organizing concept design documents for on-site presentations and endorsement, and providing the Concept Design Workshop Report.
- c. Contractor's Design Team. The primary functions of the Design Team will be to investigate, develop and present alternate design solutions. The entire Design Team must participate in all phases of the Concept Design Workshop and assist the Facilitator in developing the Concept Design Workshop Report.
- d. Concept Design Workshop Report. Summarize the workshop including the various concepts developed and presented. Include a copy of the

signature/endorsement sheet prepared and signed at the end of the on-site CDW.

- e. Award Amount. Confirm the final concept is within the contract award amount.

1.3.2 CDW Procedures

a. Preliminary Work.

Complete the following prior to the on-site workshop:

- (1) Review the contract documents and references explaining the project scope and history.
- (2) Prepare and submit, at least 14 days in advance of the CDW, electronic copies and 6 hard copies of a CDW Preliminary Concept Design (Concept #1) and a Basis of Design.

As a minimum, include the following in the CDW Preliminary Concept Design:

- (a) Site Plan
 - (b) Building Floor Plans
 - (c) Building Elevations
 - (d) Mechanical Plans
 - (e) Electrical Plans
- (3) Make arrangements for and provide an appropriately sized conference room convenient to the project site and Users for use by the Design Team and government participants during the workshop.
- (4) Incorporate any government comments received prior to the CDW into a revised Concept #1 and provide at least 20 hard copies of the revised Concept #1 documents for distribution at the workshop. If there are no revisions to the CDW Preliminary Concept Design provide at least 20 hard copies of the original Concept #1 documents for distribution at the workshop.
- (5) Facilitator conducts meeting with NAVFAC representatives before the CDW to review preparations, relationships, and the status of work to be accomplished.

b. On-Site Workshop.

On-site CDWs are typically conducted over three to five working days with minimal breaks throughout the workshop. The Design Team can expect longer than normal workdays. Accomplish the following during the on-site CDW.

- (1) On the first day of the workshop, meet with the using activity, Station and other Government representatives. The Facilitator will describe the CDW process and review the workshop agenda. The User(s) may provide a functional presentation to review User(s) requirements to aid in further development of the conceptual design.
- (2) Present the revised Concept #1 and respond to questions.

- (3) Conduct a comment/creative session to generate ideas to improve the conceptual design within the award amount. Document or request User and Government comments in writing so they may be considered, responded to, and presented at subsequent presentations.
- (4) Develop a new concept design based on comments and feedback received from the Concept #1 presentation on the first day of the CDW. Include drawings, sketches, and other graphics as necessary to describe the concept design. Prepare at least 20 hard copies for distribution at all presentations.
- (5) Repeat applicable steps as necessary. Three concepts are typically required.
- (6) The final concept must include the following:
 - (a) Site Plan: Show the layout of the proposed facility in relation to major landmarks. Show all buildings, access roads, parking, pedestrian walkways, roads, sidewalks, landscaping, and major utilities. Indicate major dimensions and orientation. Provide a building code analysis, relating the proposed building site, size, and construction type to maximum allowable limits of the International Building Code.
 - (b) Building Floor Plans: Provide floor plans depicting functional utilization of spaces including furniture and equipment layouts. Show room sizes or dimensions. Provide a Life Safety Code analysis with the floor plan to identify required life safety and egress features.
 - (c) Perspective Sketches: Provide at least one sketch to show a perspective of major buildings. Show the proposed form and massing, construction materials and colors on the sketches.
 - (d) Mechanical Plans: Provide plans to show the essential work and intent of the design. Include HVAC systems, equipment layouts and locations, zones, etc.
 - (e) Electrical Plans: Provide plans to show the essential work and intent of the design.
 - (f) Basis of Design: Describe the intent of the design by discipline. Address material quality, energy efficiency and life cycle costs.
- (7) Prepare 20 hard copies of the final concept for distribution at the final presentation.
- (8) Submit the Concept Design Workshop Report with all items included in the final concept design and the following:
 - (a) Endorsements: Include a copy of the signature/endorsement sheet.
 - (b) Comments: Include comments and resolutions concerning the final concept design.
 - (c) Executive Summary: Summarize the workshop including the

various concepts developed and presented.

(d) Special Design Features: Identify any special design features, e.g., pile foundations, physical security, intrusion detection systems, access control, TEMPEST, HEMP, etc.

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

(f) Environmental Summary: Provide a summary identifying any environmental issues, listing completed actions and items requiring further coordination, waivers or permits.

(g) Supporting Project Documentation: Provide backup documentation supporting development of the concept design, layout, and special features. Include project scope discussion, comment/resolution sheets, meeting minutes, function analysis work sheets, and economic and technical analyses if alternatives evaluated.

(9) Except for final comments, responses and endorsements, the final report should be prepared on site, before the final presentation.

(10) Conduct a comprehensive presentation of the final concept. Obtain user signatures on an endorsement sheet, signifying approval of the final concept design, subject to any final comments and agreed upon resolutions at the final presentation meeting.

(11) Endorsement sheet must include a statement confirming that the final concept is within the contract award amount and performance period.

1.3.3 CDW Report

Within 14 calendar days of completion of the on-site Concept Design Workshop, submit an electronic copy of the Concept Design Workshop Report as one file in .PDF format to the Contracting Officer. Report must include confirmation that the final concept is within the contract award amount and performance period.

1.3.4 CDW Meeting Attendees

The following Contractor personnel must attend the CDW: Project Manager, Lead Designer of Record, Design Staff representing each architectural/engineering/design discipline, Superintendent, QC and DQC Managers, and Major Subcontractors that are agreed to as necessary and authorized to conclude the CDW.

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
05/17, CHG 6: 02/21

PART 1 GENERAL

1.1 CONTRACT ADMINISTRATION

Utilize the Naval Facilities Engineering 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 e-mail submission, including originals or copies, of the documents identified in Table 1 are not permitted, except where eCMS is unavailable, non-functional or specifically requested in addition to electronic submission. When specifically requested to provide documents outside of eCMS, upload all final project documentation (e.g. documents that are signed and/or adjudicated by the Government) mentioned in Table 1 into the subject eCMS document management folders that are associated with that document type. Include the identification number of the document, type of document; the name/subject or title; and for daily reports the date (day of work) with format YYYY/MM/DD in the filename. For example for RFI's 0011_RFI_Roof_Leaking.doc; For submittals 0032a_Submittals_Light_Fixture.pdf; For Daily Reports 0132_Daily_Report_20190504.xls. Contact the Contracting Officer's Representative (COR) regarding availability of eCMS training and reference materials.

1.2 USER PRIVILEGES

The Contractor will be provided access to eCMS. All technical submittals and documents must be transmitted to the Government via the COR. 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.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" classification. Submittals not having a "G" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

List of Contractor's Personnel; G

1.4 SYSTEM REQUIREMENTS AND CONNECTIVITY

1.4.1 General

The eCMS requires a web-browser (platform-neutral) and Internet connection. Obtain from an approved vendor an External Certification Authority (ECA), Primary Key Infrastructure (PKI) certificate, or other similar digital identification to support two-factor authentication and access to eCMS. Provide and maintain computer hardware and software for

the eCMS access throughout the duration of the contract for all Contractor-designated users. Provide connectivity, speed, bandwidth, and access to the Internet to ensure adequate functionality. Neither upgrading of the Contractor's computer system nor delays associated from the usage of the eCMS will be justification or grounds for a time extension or cost adjustment to the Contract.

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, technical submittals and documents and will require access to the eCMS. Project personnel roles to be filled in the eCMS include the Contractor's Project Manager, Designer of Record, Superintendent, Quality Control (QC) Manager, and Site Safety and Health Officer (SSHO). Personnel must be capable of electronic document management. 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. Provide the following information:

- First Name
- Last Name
- E-mail Address
- Office Address
- Project Role (e.g. Project Manager, QC Manager, Superintendent)

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.

The eCMS and tablet computer must only be used for the transaction of unclassified information associated with construction projects. 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).

1.6 ECMS UTILIZATION

Establish, maintain, and update data and documentation in the eCMS throughout the duration of the contract.

Personally Identifiable Information (PII) transmittal is not permitted in the eCMS.

1.6.1 Information Security Classification/Identification

The eCMS must be used for the transmittal of the following documents. This requirement supersedes conflicting requirements in other sections, however, submittal review times in Section 01 33 00 SUBMITTAL PROCEDURES remain applicable. Table 1 - Project Documentation Types provides the

appropriate U and CUI designations for various types of project documents. Construction documents requiring CUI status must be marked accordingly. Apply the appropriate markings before any document is uploaded into eCMS. Markings are not required on U documents.

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). If a designated application is not functional within 4 hours of initial attempt, defer to the Submittal application and submit the required data as an uploaded portable document (e.g. PDF), word processor, spreadsheet, drawing, or other appropriate format. Hard copy or e-mail submission of these items is acceptable only if eCMS is documented to be not available or not functional or specifically requested in addition to electronic submission. After uploading documents to the Submittal application, transmit the submittals and attachments to the COR via the Transmittal application. For Submittals, select the following:

Preparation by = Contractor personnel assigned to prepare the submittal
 Approval by = Contracting Officer Representative (COR)
 Returned by = Design Lead/Manager
 Forwarded to = Contractor project manager

Table 1 - Project Documentation Types

SUBJECT/NAME	DESIG	REMARKS	ECMS APPLICATION
As-Built Drawings	U	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 and Transmittals
Building Information Modeling (BIM)	U	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 and Transmittals
Construction Permits	U	Refer to rules of the issuing activity, state or jurisdiction	Submittals and Transmittals
Construction Schedules (Activities and Milestones)	U	After the schedule submittal is approved by the COR, import the schedule file into the scheduling application, and select "Approve" to establish a new schedule baseline	Submittals, Transmittals and Scheduling App

SUBJECT/NAME	DESIG	REMARKS	ECMS APPLICATION
Construction Schedules (Cost-Loaded)	CUI	After the schedule submittal is approved by the COR, import the schedule file into the scheduling application, and select "Approve" to establish a new schedule baseline	Submittals, Transmittals and Scheduling App
Construction Schedules (3-Week Lookahead)	U	Import the schedule file into the scheduling application, and select "Approve" to establish a new schedule baseline	Scheduling App
DD 1354 Transfer of Real Property	U		Submittals and Transmittals
Daily Production Reports	CUI	Provide weather conditions, crew size, man-hours, equipment, and materials information	Daily Report
Daily Quality Control (QC) Reports	CUI	Provide QC Phase, Definable Features of Work Identify visitors	Daily Report
Designs and Specifications	U	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 and Transmittals
Environmental Notice of Violation (NOV), Corrective Action Plan	U	Refer to rules of the issuing activity, state or jurisdiction	Submittals and Transmittals
Environmental Protection Plan (EPP)	CUI		Submittals and Transmittals
Invoice (Supporting Documentation)	CUI	Applies to supporting documentation only. Invoices are submitted in Wide-Area Workflow (WAWF)	Submittals and Transmittals

SUBJECT/NAME	DESIG	REMARKS	ECMS APPLICATION
Jobsite Documentation, Bulletin Board, Labor Laws, SDS	U		Submittals and Transmittals
Meeting Minutes	CUI		Meeting Minutes
Modification Documents	CUI	Provide final modification documents for the project. Upload into "Modifications - RFPs"	Document Management
Operations & Maintenance Support Information (OMSI/eOMSI), Facility Data Worksheet	U	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 and Transmittals
Photographs	U	Subject to base/installation restrictions	Submittals and Transmittals
QCM Initial Phase Checklists	CUI		Checklists (Site Management)
QCM Preparatory Phase Checklists	CUI		Checklists (Site Management)
Quality Control Plans	CUI		Submittals and Transmittals
QC Certifications	U		Submittals and Transmittals
QC Punch List	U		Punch Lists (Testing Logs)
Red-Zone Checklist	U		Checklists (Site Management)
Rework Items List	CUI		Punch Lists (Testing Logs)
Request for Information (RFI) Post-Award	CUI		RFIs

SUBJECT/NAME	DESIG	REMARKS	ECMS APPLICATION
Safety Plan	CUI		Daily Report
Safety - Activity Hazard Analyses (AHA)	CUI		Daily Report
Safety - Mishap Reports	CUI		Daily Report
SCIF/SAPF Accreditation Support Documents	CUI	Note: Some Construction Security plans may be classified as Secret. Classified information must not be uploaded into eCMS. Refer to the Site Security Manager, as applicable.	Submittals and Transmittals
Shop Drawings	U	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 and Transmittals
Storm Water Pollution Prevention (Notice of Intent - Notice of Termination)	U	Refer to rules of the issuing activity, state or jurisdiction	Submittals and Transmittals
Submittals and Submittal Log	U		Submittals and Transmittals
Testing Plans, Logs, and Reports	CUI		Submittals and Transmittals
Training/Reference Materials	U		Submittals and Transmittals
Training Records (Personnel)	CUI		Submittals and Transmittals
Utility Outage/Tie-In Request/Approval	CUI		Submittals and Transmittals
Warranties/BOD Letter	CUI		Submittals and Transmittals

SUBJECT/NAME	DESIG	REMARKS	ECMS APPLICATION
Quality Assurance Reports	CUI		Checklists (Government initiated)
Non-Compliance Notices	CUI		Non-Compliance Notices (Government initiated)
Other Government-prepared documents	CUI		GOV ONLY
All Other Documents	CUI	Refer to FOIA guidelines and contact the FOIA official to determine whether exemptions exist	As applicable

1.6.2 Markings on CUI documents

- a. Only CUI documents being electronically uploaded into the eCMS (.docx, .xlsx, .ppt and others as appropriate), and associated paper documents described in the paragraph CONTRACT ADMINISTRATION require CUI markings as indicated in the subparagraphs below.
- b. CUI documents that are originally created within the eCMS application using the web-based forms (RFIs, Daily Reports, and others as appropriate) will be automatically watermarked by the eCMS software, and these do not require additional markings.
- c. CUI documents must be marked "CONTROLLED UNCLASSIFIED INFORMATION" at the bottom of the outside of the front cover (if there is one), the title page, the first page, and the outside of the back cover (if there is one).
- d. CUI documents must be marked on the internal pages of the document as "CONTROLLED UNCLASSIFIED INFORMATION" at top and bottom.
- e. Where Installations require digital photographs to be designated CUI, place the markings on the face of the photograph.
- f. For visual documentation, other than photographs and audio documentation, mark with either visual or audio statements as appropriate at both the beginning and end of the file.

1.7 QUALITY ASSURANCE

Requested Government response dates on Transmittals and Submittals must be in accordance with the terms and conditions of the Contract. 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.

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)
05/18, CHG 3: 08/20

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 Primavera's scheduling programs are used.

1.2 SCHEDULE REQUIREMENTS PRIOR TO THE START OF WORK

1.2.1 Preliminary Scheduling Meeting

Before preparation of the Project Baseline Schedule, and prior to the start of work, meet with the Contracting Officer to discuss the proposed schedule and the requirements of this section. Propose projected data dates for monthly update schedules for the project and incorporate each monthly update submittal into submittal register. Discuss required forms, terminology, and submittal requirements of this section and other requirements related to schedule management for this contract.

1.2.2 Project Baseline Schedule

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 schedule 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 statused for any activity.

Only bonds may be paid 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.
- c. Review of any schedule updates.

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

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

1.2.2.3 Construction Baseline

Submit the 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 schedule updates.

Submittal of the Construction Baseline NAS must be the Contractor's certification that the submitted schedule 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 THREE-WEEK LOOK AHEAD SCHEDULE

1.3.1 Weekly CQC Coordination and Production Meeting

Deliver electronic file of 3-Week Look Ahead Schedule to the Contracting Office at least 24 hours prior to the weekly scheduled CQC Coordination and Production Meeting. Contractor is required to provide all attendees at the CQC Coordination and Production Meeting with a hard copy of the 3-Week Look Ahead Schedule.

1.3.2 Look Ahead Schedule Requirements

Prepare and issue a 3-Week Look Ahead schedule to provide a more detailed day-to-day plan of upcoming work identified on the Project Network Analysis Schedule. 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 or scope of work.
- b. Update schedule each week to show the planned work for the current and following two-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. Clearly identify longest path activities on the Three-Week Look Ahead Schedule. Include a key or legend that distinguishes longest path activities. Include all Longest Path activity NAS start/finish dates exceeded and/or occurring during this period.
- e. 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.

- f. 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.

1.4 MONTHLY NETWORK ANALYSIS

Submittal of Monthly NAS is the Contractor's certification that the submitted schedule 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 Network Analysis Updates

- a. Regardless of whether an invoice is being submitted monthly, an updated schedule must be submitted monthly to the Government. The Monthly NAS update must be submitted within 10 calendar days of the data date.
- b. Provide all items listed in paragraph REQUIRED TABULAR REPORTS AND NATIVE P6 XER FILES, with each monthly NAS update submittal.
- c. Meet with Government representative(s) at monthly intervals to review and agree on the information presented in the updated project schedule. The submission of an accepted, updated schedule to the Government is a condition precedent to the processing of the Contractor's invoice.
- d. 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. Software Settings: Handle schedule calculations and Out-of-Sequence progress (if applicable) through Retained Logic, not Progress Override. Show all activity durations and float values in days. Show activity progress using Remaining Duration. Set default activity type to "Task Dependent".
- e. Update schedule must reflect current Contract Completion Date and contract value in accordance with all conformed contract modifications issued prior to data date of NAS update.

1.4.2 As-Built Schedule

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

1.5 CORRESPONDENCE AND TEST REPORTS

Reference Schedule activity IDs that are being addressed in each correspondence (e.g., letters, 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 SCHEDULING REQUIREMENTS

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

1.7 SUBMITTALS

Government approval/acceptance is required for submittals with a "G" classification. Submittals not having a "G" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Baseline NAS; G

Construction Baseline NAS; G

Designated Project Scheduler; G

SD-07 Certificates

Three-Week Look Ahead Schedule; G

Monthly Network Analysis Updates; G

SD-11 Closeout Submittals

As-Built Schedule; G

1.8 SOFTWARE

Prepare and maintain project schedules using Primavera P6 software in a version compatible with Government's current version. Importing data into P6 using data conversion techniques or third party software is cause for rejection of the submitted schedule. Schedules with Performing Organizational Breakdown Structure (POBS) data is cause for rejection.

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 Contracting Officer may remove the Designated Project Scheduler, and require replacement, if the scheduler does not effectively fulfill their duties in accordance with the contract requirements. Payment request will not be processed without an approved Designated Project Scheduler.

1.9.1 Qualifications

The Designated Project Scheduler must have prepared and maintained at least three previous construction schedules, of similar size and complexity to this contract, using Primavera P6.

1.9.2 Duties

Duties of the Designated Project Scheduler:

- a. Prepare Baseline NAS.
- b. Prepare monthly schedule updates.
- c. Prepare tabular reports.
- d. Prepare Time Impact Analysis (TIA) as necessary.
- e. Provide certification that NAS and TIA submittals conform to the contract requirements.
- 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, schedule updates, critical activities, potential delays, and contract modifications impacting the schedule. Have a computer with P6 software available during the meeting.

1.10 NETWORK SYSTEM FORMAT

Prepare the schedule 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 schedule submission.

1.10.1 Schedule 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 times for procurement, Contractor quality control and construction, acceptance testing and training in the schedule.
- e. Include the Government approval time required for the submittals that require Government Approval prior to construction, as indicated in Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES.
- f. Create separate activities for each Phase, Area, Floor Level and Location the activity is occurring.
- g. Do not use construction category activity to represent non-work type reference (e.g. Serial Letter, Request for Information) in NAS. Place Non-work reference within the P6 activity details notebook.

Activity categories included in the schedule 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.
- d. Minimize redundant logic ties.
- e. Once an activity exists on the schedule it must not be deleted or renamed to change the scope of the activity and must not be removed from the schedule logic without approval from the Contracting Officer.
 - (1) While an activity cannot be deleted, where said activity is no longer applicable to the schedule, 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. Actual finish date for activity that falls behind the data date. Redistribute accordingly any remaining budget associated with that activity, to other remaining appropriate activity.
 - (2) Document any such change in the activities' "Notebook," including a date and explanation for the change.
 - (3) The ID number for a "NO LONGER REQUIRED" activity must not be re-used for another activity.

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 Schedule.

1.10.1.4 Assigned Calendars

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

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 schedule. 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

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 Three-Week Look Ahead Schedule. 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 must not have a duration in excess of 20 working days. 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.

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.

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

Include in the baseline schedule, 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 Section 23 05 93 TESTING, ADJUSTING AND BALANCING FOR HVAC and Section 23 09 00 INSTRUMENTATION AND CONTROL FOR

HVAC.

- a. Identify the general area or location(s) for Government Acceptance Testing of DALT, TAB and PVT.
- b. Incorporate into the baseline schedule, time periods required for advance notification of work, and Government submittal review in accordance with Section 23 05 93 TESTING, ADJUSTING AND BALANCING FOR HVAC, paragraph DALT AND TAB SUBMITTAL AND WORK SCHEDULE.
- c. Include the following as schedule 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) Season I TAB Field Work
 - (10) Season I Certified Final TAB Report, Government review
 - (11) Endurance Testing, Government review
 - (12) PVT Field Work
 - (13) PVT Report, Government review
 - (14) Season I TAB Field Acceptance Testing
 - (15) Season II TAB Field Work
 - (16) Season II Certified Final TAB Report, Government review
 - (17) Season II TAB Field Acceptance Testing
 - (18) Post-Occupancy Endurance Testing Government review
 - (19) Post-Occupancy PVT Field Work

1.10.1.6 Contract Milestones and Constraints

1.10.1.6.1 Project Start Date Milestones

Include as the first activity on the schedule 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 schedule 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 schedule 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 schedule 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 schedule 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 schedule 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 78 00 CLOSEOUT SUBMITTALS.

1.10.1.6.7 Projected Completion Milestone

Include an unconstrained finish milestone on the schedule titled "Projected Completion." Projected 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 00.05 20 DESIGN AND CONSTRUCTION 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 schedule 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 schedule updates must be such that if the finish of the "Projected Completion" milestone falls after the contract completion date, then negative float is calculated on the longest path. If the finish of the "Projected 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 5 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 categories including, at a minimum, the following:

a. Project Milestones:

- (1) Management Milestones
- (2) Project Administrative Meetings
- (3) Permits
- (4) Design Phase
- (5) Submittals and Reviews

b. Pre-Construction Phase:

- (1) Submittals and Reviews
- (2) Procurement
- (3) Mobilization

c. Construction Phase: Create multiple sub-sections in accordance with project specific categories 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 sub-category of Conformed and Non-Conformed under Modification WBS. Create multiple sub-sections 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.

1.10.1.7.2 Responsibility Code

All activities in the project schedule must be identified with the resource for completing the task. Activities must not belong to more than one responsible party.

1.10.1.7.3 Activity Category Code

Provide user defined "CAT" codes for Project Level activity codes. Use the following 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 "CLOS" value to dedicated Close Out type activity
- f. Assign "OTHR" to other activity not otherwise designated
- g. Assign "DSGN" value to Design type activity

1.10.1.7.4 Construction Specification Institute (CSI) Masterformat Code

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

1.10.1.7.5 Drawing Code

Identify all activities in the project schedule with its respective Drawing Code. The Drawing Code is the Sheet Number on the primary project drawing which indicates work to be performed. If an activity does not have an applicable Drawing 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.

1.10.1.9.1 Cost Loading Activities

Assign material and equipment costs, including their quantities, for which payment will be requested in advance of installation, to their respective procurement activity. Assign labor costs, including their quantities, for material and equipment paid for after installation to their respective construction activities. Include all typical mobilization costs dispersed over early construction activities. 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. The value of testing and closeout WBS section may not be less than 10 percent of the total costs for procurement and construction activities. ALL activities assigned Government responsibility will have Zero Cost. No contractor cost should be assigned to an activity designated as a Government responsibility. Do not include field overhead positions as individual pay items. Evenly disperse overhead costs and profit to each activity over the duration of the project.

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 Schedule 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 CPM schedule 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 Schedule 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) 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 schedule submittals:

a. Time Scaled Logic Schedule

Provide formatted 11 by 17-inch Time-scaled Logic Schedule in color and landscape-oriented with each schedule 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

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

Provide formatted 11 by 17-inch Time-scaled Logic Schedule in color and landscape-oriented with each monthly update schedule 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 month update or the accepted baseline schedule for the first update submittal as the baseline and primary baseline in P6 before printing the schedule. 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 Government version of P6. Each native schedule file must have a unique file name to include project name and data date using (yyyy-mm-dd) convention. Each native schedule must have a unique Project ID and Project Name.
- d. Log Report: P6 Scheduling/Leveling Report.
- e. Narrative Report: Identify and justify:
- (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) Schedule 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 schedule and current updated schedule include: 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;
 - (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 schedule 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. Describe the construction activity(s) that was (were) scheduled, impacted.

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

- f. Earned Value Report: Derive from and correspond to P6 cost loaded schedule. 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 current budget, previous physical percent complete, to-date physical percent complete, previous earned value, to-date earned value, cost this period and cost to complete on the report for each activity.
- g. Schedule Variance Control (SVC) Diagram: With each schedule submission, provide a SVC diagram 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. Baseline or Monthly Update Checklist as applicable completed and certified by Qualified Scheduler. Baseline Project Schedule and Monthly Update Schedule Checklists can be found on the Whole Building Design Guide website at <https://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/>

ufgs-01-32-17-00-20

- j. Screen shot PDF of P6 Time Periods Settings referenced in paragraph SCHEDULE SOFTWARE SETTINGS AND RESTRICTIONS, list item d.(2): ADMIN DROP-DOWN MENU, ADMIN PREFERENCES, TIME PERIODS TAB
- k. Daily Reported Production Activity: Submit on a monthly basis, in electronic spreadsheet (format provided by the Government), summary of daily reported production activity for the reporting month in the update schedule. Use the following columns for reporting:
 - (1) Date
 - (2) Activity ID
 - (3) Work Description
 - (4) Contractor
 - (5) Billable Hours

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 schedule form. The narrative must define the scope and conditions of the change; provide start and finish dates of impact, successor and predecessor activity to impact period, responsible party; describe how it originated, and how it impacts the schedule's longest path. The schedule submission must consist of three native XER files:
 - (1) Fragnet used to define the scope of the changed condition
 - (2) Most recent accepted schedule update as of the time of the impact start date. Update this schedule to show all activity progress as of the time of the impact start date. The impact start date is identified as the time when an existing activity is impeded for either starting or finishing.
 - (3) The impacted schedule that has the fragnet inserted in the updated schedule and the schedule "run" so that the new completion date is determined.
- b. 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 schedule update used. Updated schedules for periods following the impact start date will be used 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.
- c. 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 schedule 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

- d. Submit electronic file containing the narrative and the source schedule files used in the time impact analysis.

1.12 PROJECT FLOAT

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

The use of Resource Leveling or other techniques used for the purpose of artificially adjusting activity durations to consume float and influence longest path is 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 4: 12/18

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 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) 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, 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.

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

SD-01 Preconstruction Submittals

Submittal Register Format; 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 not required to be submitted to the Government for surveillance, 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.

1.4.2 Submittals Reserved for Government Surveillance

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

If during the Government surveillance of construction submittals, items are brought to the Contractor's attention as non-compliant, the Contractor 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 related submittals 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.
- b. Submit geotechnical related submittals pertaining to the soils investigations (reports and soils analysis), foundations (shallow and deep), pavements structure design, test pile and production pile testing and installation.
- c. Submit conveying related submittals pertaining to elevators, escalators, weight handling equipment, lifts, and conveyors.
- d. Submit roofing submittals pertaining to materials and systems used to make up the roof system.
- e. Submit HVAC Testing, Adjusting, and Balancing required submittals.
- f. Submit telecommunications shop drawings, as described in Part 4, D50 ELECTRICAL, for coordination with the NMCI Contractor.
- g. Submit Performance Verification and Acceptance Testing submittals listed in the PTS and referenced UFGS.
- h. Submit all Interim Special Inspection Reports on a bi-weekly basis until work requiring special inspections is complete.
- i. Submit all Structural Observation Reports and the Final Report of Special Inspections.
- j. Submit the exterior enclosure barrier drawings.

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 and Section 01 57 19.01 20, SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS.

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

- a. Transformers
- b. Medium Voltage Cable
- c. Intercom System
- d. Section 23 09 13 and Section 23 09 23.02
- e. Section 23 05 93

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

1.4.3.2 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

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. Specifically point out variations from contract requirements in transmittal letters 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.

b. Submitting Variations

When submitting a variation, deliver the written request 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 and documented approval from the DOR.

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.

c. Warranting Variations Are Compatible

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.

1.5.2 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. 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, no smaller than 3 inches 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.

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 --

CONTRACTOR'S SUBMITTAL TRANSMITTAL		CONTRACT NO:		DATE:	
		TRANSMITTAL/RESUBMITTAL NO.:		PREVIOUS SUBMITTAL NO (if applicable):	
FROM CONTRACTOR:		PROJECT TITLE AND LOCATION:			
TO:					
CONTRACTOR USE ONLY		REVIEWER USE ONLY		GOVT USE ONLY	
<div>List only one specification division per form</div> <div>List only one of the following categories on each transmittal form and indicate which is being submitted</div> <div><input type="checkbox"/> Contractor Approval <input type="checkbox"/> Govt Approval <input type="checkbox"/> Variance Request (Govt Approval)</div>		ACTION CODES		ACTION CODES	
		A – Approved D – Disapproved AN – Approved As Noted ANR – Approved As Noted Resubmit NR – Not Reviewed		A – Approved D – Disapproved (Revise and Resubmit) AN – Approved As Noted ANR – Approved As Noted (Resubmit) NR – Not Reviewed	
I	SPEC. SECT. & PARA. And/or DWG. NO.	ITEM IDENTIFICATION (Type, size, model no., Mfg. Name, drawing or brochure number)	NO. OF COPIES	RECOMMENDED ACTION	REVIEWER'S INITIALS AND DATE
T					
E					
M					
CONTRACTOR'S CERTIFICATION AND COMMENTS: IT IS HEREBY CERTIFIED THAT THE EQUIPMENT AND/OR MATERIAL SHOWN AND MARKED IN THIS SUBMITTAL IS THAT PROPOSED TO BE INCORPORATED INTO THIS CONTRACT. IS IN COMPLIANCE WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS, AND CAN BE INSTALLED IN THE ALLOCATED SPACES.			DATE RECEIVED BY REVIEWER:		DATE RECEIVED BY GOVT:
			REVIEWER'S COMMENTS:		GOVT COMMENTS:
NOTE: APPROVAL BY THE GOVERNMENT OF SUBMITTED ITEMS DOES NOT RELIEVE THE CONTRACTOR FROM COMPLYING WITH ALL THE REQUIREMENTS OF THE CONTRACT PLANS AND SPECIFICATIONS			REVIEWER'S SIGNATURE:		DATE:
CONTRACTOR'S QC (SIGNATURE):			DATE:		DATE:

SUBMITTAL REGISTER

TITLE AND LOCATION																	CONTRACTOR									
Composite Shop																										
A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	G O V T C L A S S I F I C A T I O N	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS									
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N	DATE OF ACTION		(m)	(n)	(o)	(p)											
(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	1.3.1.1																						
	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																						
			Progress and Completion	1.4																						
			Pictures																							
			Design Submittal Packaging	1.8.1																						
			Performance Assessment Plan	1.12																						
			(PAP)																							
	01 31 19.05 20		SD-01 Preconstruction Submittals																							
			CDW Facilitator Experience	1.3.1	G																					
			Resume																							
			CDW Preliminary Concept	1.3.2	G																					
			Design																							
			CDW Report	1.3.3	G																					
	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																							
			Three-Week Look Ahead	1.3	G																					
			Schedule																							

SUBMITTAL REGISTER

TITLE AND LOCATION
Composite Shop

CONTRACTOR

A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	G O V T C L A S S I F I C A T I O N	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY				MAILED TO CONTR/	DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	A C T I O N	DATE OF ACTION			
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)	
		01 32 17.00 20	Monthly Network Analysis Updates	1.4.1	G													
			SD-11 Closeout Submittals															
			As-Built Schedule	1.4.2	G													
		01 33 00.05 20	SD-01 Preconstruction Submittals															
			Submittal Register	1.3.1	G													
		01 33 10.05 20	SD-01 Preconstruction Submittals															
			Consolidated RFP Documents	2.1	G													
			Submittal Register	1.5.5	G													
			SD-05 Design Data															
			Design Drawings	1.7	G													
			Specifications	1.9	G													
			Basis of Design	1.10	G													
			Design Submittals	2.2	G													
			BIM Project Execution Plan (PxP)	1.8	G													
			Design Model	1.8	G													
			Visual Review Report	1.8	G													
			Clash Detection Report	1.8	G													
			SD-11 Closeout Submittals															
			Record Documents	1.11	G													
			DD Form 1354	1.11.3	G													
			Record Model	1.8	G													
		01 35 13	SD-01 Preconstruction Submittals															
			FAA Form 7460-1	3.1.1														
			FAA Form 7460-2	3.1.1														
		01 35 26	SD-01 Preconstruction Submittals															

SUBMITTAL REGISTER										CONTRACT NO.							
TITLE AND LOCATION Composite Shop										CONTRACTOR							
A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	G O V T C L A S S I F I C A T I O N	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY				REMARKS		
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N C O D E	DATE OF ACTION	DATE FWD TO APPR AUTH/	DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER		A C T I O N C O D E	DATE OF ACTION
(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)	1.8	G												
			Accident Prevention Plan (APP)	1.8	G												
			Accident Prevention Plan (APP)	1.8	G												
			Accident Prevention Plan (APP)	1.8	G												
			APP - Construction	1.8.1	G												
			SD-06 Test Reports														
			Monthly Exposure Reports	1.4													
			Notifications and Reports	1.13													
			Accident Reports	1.13.2	G												
			LHE Inspection Reports	1.13.3													
			SD-07 Certificates														
			Contractor Safety Self-Evaluation	1.5													
			Checklist														
			Crane Operators/Riggers	1.7.1.4													
			Standard Lift Plan	1.8.3.2	G												
			Critical Lift Plan	1.8.3.3	G												
			Activity Hazard Analysis (AHA)	1.9													
			Confined Space Entry Permit	1.10.1													
			Hot Work Permit	1.10.1													
			Certificate of Compliance	1.13.4													
			License Certificates	1.15													
			Radiography Operation Planning	1.15.1	G												
			Work Sheet														
			Portable Gauge Operations	1.15.1	G												
			Planning Worksheet														
	01 45 00.05 20		SD-01 Preconstruction Submittals														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
Composite Shop

CONTRACTOR

A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	G O V T C L A S S I F I C A T I O N	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY				MAILED TO CONTR/	DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N	C O D E	DATE OF ACTION	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	A C T I O N	C O D E	DATE OF ACTION		
(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															
			Preconstruction Survey	1.5.1														
			Solid Waste Management Permit	1.9	G													
			Regulatory Notifications	1.5.2	G													
			Environmental Protection Plan	1.6	G													
			Stormwater Pollution Prevention Plan		G													
			Stormwater Notice of Intent	3.2.1.2	G													
			Dirt and Dust Control Plan	1.6.9.1	G													
			Employee Training Records	1.5.5	G													
			Environmental Manager	1.5.4	G													
			Qualifications															
			SD-06 Test Reports															
			Laboratory Analysis	3.7.1.1.2														
			Monthly Solid Waste Disposal Report	1.9.1	G													
			SD-07 Certificates															
			Employee Training Records	1.5.5	G													
			ECATTS Certificate Of Completion	1.4.1.2	G													

SUBMITTAL REGISTER

TITLE AND LOCATION
Composite Shop

CONTRACTOR

A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	G O V T C L A S S I F I C A T I O N	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	A C T I O N	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 57 19	Erosion and Sediment Control Inspector	1.5.5													
			SD-11 Closeout Submittals														
			Stormwater Pollution Prevention Plan Compliance Notebook	3.2.1.4	G												
			Stormwater Notice of Termination	3.2.1.5	G												
			Waste Determination Documentation	3.7.1	G												
			Disposal Documentation for Hazardous and Regulated Waste	3.7.3.6	G												
			Assembled Employee Training Records	1.5.5	G												
			Solid Waste Management Permit	1.9	G												
			Project Solid Waste Disposal Documentation Report	3.7.2.1	G												
			Contractor Hazardous Material Inventory Log	3.8.1	G												
			Hazardous Waste/Debris Management	3.7.3.1	G												
			Regulatory Notifications	1.5.2	G												
			Sales Documentation	3.7.2.1	G												
			Contractor Certification														
			As-Built Topographic Survey	3.2.1.5													
		01 74 19	SD-01 Preconstruction Submittals														
			Construction Waste Management Plan	1.6	G												

SUBMITTAL REGISTER										CONTRACT NO.							
TITLE AND LOCATION Composite Shop		CONTRACTOR															
A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION ITEM SUBMITTED	P A R A G R A P H	G O V T C L A S S I F I C A T I O N	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY				REMARKS		
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N C O D E	DATE OF ACTION	DATE FWD TO APPR AUTH/	DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER		A C T I O N C O D E	DATE OF ACTION
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
	01 74 19		SD-11 Closeout Submittals														
			Final Construction Waste	1.8													
			Diversion Report														
	01 78 00		SD-03 Product Data														
			Warranty Management Plan	1.6.1													
			Warranty Tags	1.6.4													
			Final Cleaning	3.4													
			Spare Parts Data	1.5													
			SD-08 Manufacturer's Instructions														
			Instructions	1.6.1													
			SD-10 Operation and Maintenance														
			Data														
			Operation and Maintenance	3.3	G												
			Manuals														
			SD-11 Closeout Submittals														
			As-Built Drawings	3.1	G												
			Record Drawings	3.2	G												
			As-Built Record of Equipment	1.6.1													
			and Materials														
			Certification of EPA Designated	2.1	G												
			Items														
			Certification Of USDA Designated	2.2	G												
			Items														
			Interim DD FORM 1354	3.5.1	G												
			Checklist for DD FORM 1354	3.5.2	G												

SECTION 01 33 10.05 20

DESIGN SUBMITTAL PROCEDURES

05/17: CHG 5 - 03/19

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	(2014; with Change 4, 2018) Navy and Marine Corps Design
UFC 1-200-01	(2019) DoD Building Code
UFC 1-300-08	(2009, with Change 2, 2011) Criteria for Transfer and Acceptance of DoD Real Property
UFC 4-010-06	(2016; with Change 1, 2017) Cybersecurity of Facility-Related Control Systems

1.3 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.

1.4 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.

SD-01 Preconstruction Submittals

Consolidated RFP Documents; G

Submittal Register; G

SD-05 Design Data

Design Drawings; G

Specifications; G

Basis of Design; G

Design Submittals; G

BIM Project Execution Plan (PxP); G

Design Model; G

Visual Review Report; G

Clash Detection Report; G

SD-11 Closeout Submittals

Record Documents; G

DD Form 1354; G

Final Record Model; G

1.5 DESIGN QUALITY CONTROL

1.5.1 Contractor Reviewing and Certifying Authority

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

1.5.2 Government Approving Authority

The Contracting Officer is the approving authority for design submittals.

1.5.3 Designer of Record Certifying Authority

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

1.5.4 Contractor Construction Actions

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

1.5.4.1 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.

1.5.5 Contractor's Responsibilities

- a. Designate a lead licensed architect or engineer to be in responsible charge to coordinate the design effort of the entire project. This lead architect or engineer 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 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 78 24.00 20 FACILITY ELECTRONIC OPERATION AND MAINTENANCE SUPPORT INFORMATION (eOMSI) for Contractor's eOMSI responsibilities.

1.5.6 QC Organization Responsibilities

- a. The DQC 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 Design Quality Control (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.

1.5.7 Government Responsibilities

The Government will:

- a. Note date on which submittal was received from QC manager, on each submittal.
- b. Perform a quality assurance (QA) review of submittals. Government will notify Contractor when comments for that design package are posted and ready for Contractor evaluation and resolution.
- c. Upon submittal of final design package and resolution of comments by the Contractor, the Government will sign final design package, when approved, and return electronic copy of signed design documents to the Contractor.
- d. Upon Government receipt and acceptance of the Designer of Record signed and stamped final design submission for all work, a no-cost unilateral modification will be issued to incorporate the final design into the contract.

1.5.7.1 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.

1.6 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 required 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.

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

1.7 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 for the final drawings on CD-ROM or DVD disks in the appropriate CAD format. Drawing files must be full files, uncompressed and unzipped.

1.7.1 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.

1.7.2 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.

1.7.3 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.

1.7.4 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.

1.7.5 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.

1.7.6 Units of Measure

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

1.8 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)

1.9 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.

1.9.1 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.

1.9.2 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/ffc/dod/unified-facilities-guide-specifications-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) and NASA (.00 40 suffix) electrical and mechanical specifications. 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 UFC 1-300-02, Unified Facilities Guide Specifications (UFGS) Format Standard.

1.9.3 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.

1.9.4 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 ELECTRONIC OPERATION AND MAINTENANCE SUPPORT INFORMATION (eOMSI) for Contractor's eOMSI responsibilities.

1.9.5 Specification Software

Submit the final specification source files in SpecsIntact.

1.10 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 at the Concept Design Workshop to demonstrate the concept of the project is fully understood and the design is based on sound engineering principles. Provide design analyses for each discipline and include the following:

- a. Basis of design that includes:
 - (1) An introductory description of the project concepts that addresses the salient points of the design;
 - (2) An orderly and comprehensive documentation of criteria and rationale for system selection; and
 - (3) The identification of any necessary licenses and permits that are anticipated to be required as a part of the design 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. 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.
- e. Section titled "Antiterrorism" that documents the antiterrorism features

- f. Fall Protection Analysis
- g. 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.
- h. eOMSI Facility Data Workbook (FDW)
- i. BIM P&P
- j. Ergonomic Analysis
- k. Section titled "Cybersecurity" that documents the cybersecurity design and construction of facility-related control system requirements.

1.10.1 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.

1.10.2 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.

1.10.3 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 Preliminary 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.

1.10.4 Ergonomic Basis of Design

Facilities, processes, and job tasks must be designed to reduce or eliminate work-related musculoskeletal (WMSD) injuries and risk factors in the workplace. Identify ergonomic design considerations in the basis of design with the Design Development and Preliminary submittals. The Basis of Design shall include a comprehensive ergonomic risk analysis of WMSD factors. Refer to RFP Part 2, Section 01 35 26, GOVERNMENTAL SAFETY REQUIREMENTS for ergonomic protection requirements.

1.10.5 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.

1.11 RECORD DOCUMENTS

1.11.1 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 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 00.05 20, DESIGN AND CONSTRUCTION QUALITY CONTROL.

1.11.2 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.

1.11.3 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). 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.

1.11.4 Record Model

Provide Record Model in accordance with FC 1-300-09N.

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.

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. Master Site Plan
- b. Demolition
- c. Site work
- d. 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. Concept Design presented at Concept Design Workshop.
- b. Prefinal (100 percent) Design - Government Progress QA. 14 calendar day Government review time.
- c. Final Design - Government QA. 14 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. 14 calendar day Government review time.
- b. Final Design - Government QA. 14 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 claimant.
- 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 and two hard copy(s) to the Project Manager.
- b. Three hard copy(s) to the Construction Manager.
- d. Two hard copy(s) to the Client.

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 CAD 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) 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.
- d. Indicate which upcoming design submittal will be affected by the subject design change,
- e. 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.
- f. Coordination measures proposed to incorporate the design change or variation into the construction.
- g. 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/ffc/navy-navfac/design-build-request-proposal>.

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 35 13

SPECIAL PROJECT PROCEDURES

11/20

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. Code (USC)

49 USC 44718 Structures Interfering with Air Commerce
or National Security

49 USC 46301 Civil Penalties

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)

14 CFR 77 Safe, Efficient Use, and Preservation of
the Navigable Airspace

1.2 DEFINITIONS

1.2.1 Federal Aviation Administration (FAA) Notice of Proposed Construction or Alteration

- a. FAA Notice of Proposed Construction or Alteration may be required in accordance with 49 USC 44718 and 14 CFR 77, depending on height of construction equipment on site, height of temporary structures, proximity to an airport or heliport, and specific location of equipment or temporary structure. For the purpose of notifying the FAA, proximity shall be defined as within 5 nautical miles of a Government or civilian airfield, including landing areas, taxiways, runways and helicopter pads.
- b. In order to determine if a FAA Notice of Proposed Construction or Alteration is required, refer to 14 CFR 77 Subpart B. Alternately, utilize the FAA's Notice Criteria Tool located at: <https://oeaaa.faa.gov/oeaaa/external/portal.jsp>. The FAA will determine if the equipment or temporary structure exceeds obstruction standards and may pose a hazard to air navigation.
- c. Failure to comply with the provisions of 14 CFR 77 are subject to Civil Penalty under Section 902 of the Federal Aviation Act of 1958, as amended and pursuant to 49 USC 46301 Subpart (a).

1.3 SUBMITTALS

Government approval is required for submittals with a "G" classification.

Submittals not having a "G" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

FAA Form 7460-1

FAA Form 7460-2

PART 2 PRODUCTS

2.1 AIRFIELD OBSTRUCTION LIGHTS

Airfield obstruction lights must be in accordance with FAA AC 70/7460-1 and have red or white lenses.

PART 3 EXECUTION

3.1 HAZARDS TO AIRFIELD AND HELIPORT OPERATION

In addition to DFARS 252.236-7005 Airfield Safety Precautions, the following paragraphs apply.

3.1.1 Contractor FAA Notification

When required in accordance with 49 USC 44718 and 14 CFR 77, submit FAA Form 7460-1 and attachments directly to the FAA a minimum of 60 calendar days prior to the start date of the operations that may affect air traffic. Submit supplemental notification FAA Form 7460-2 to the FAA within 48 hours prior to start of the construction. Simultaneous with submission to the FAA, submit both forms to the Contracting Officer for information. It is the Contractor's responsibility to notify the FAA when required.

-- End of Section --

SECTION 01 35 26

GOVERNMENTAL SAFETY REQUIREMENTS

11/20, 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.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B30.3	(2020) Tower Cranes
ASME B30.5	(2018) Mobile and Locomotive Cranes
ASME B30.8	(2020) Floating Cranes and Floating Derricks
ASME B30.9	(2018) Slings
ASME B30.20	(2018) Below-the-Hook Lifting Devices
ASME B30.22	(2016) Articulating Boom Cranes
ASME B30.23	(2016) Personnel Lifting Systems Safety Standard for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings
ASME B30.26	(2015; R 2020) Rigging Hardware

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP A10.22	(2007; R 2017) Safety Requirements for Rope-Guided and Non-Guided Workers' Hoists
ASSP A10.34	(2021) Protection of the Public on or Adjacent to Construction Sites
ASSP A10.44	(2020) Control of Energy Sources (Lockout/Tagout) for Construction and Demolition Operations
ASSP Z244.1	(2016) The Control of Hazardous Energy Lockout, Tagout and Alternative Methods
ASSP Z359.0	(2018) Definitions and Nomenclature Used for Fall Protection and Fall Arrest
ASSP Z359.1	(2020) The Fall Protection Code
ASSP Z359.2	(2017) Minimum Requirements for a Comprehensive Managed Fall Protection Program

ASSP Z359.3	(2019) Safety Requirements for Lanyards and Positioning Lanyards
ASSP Z359.4	(2013) Safety Requirements for Assisted-Rescue and Self-Rescue Systems, Subsystems and Components
ASSP Z359.6	(2016) Specifications and Design Requirements for Active Fall Protection Systems
ASSP Z359.7	(2019) Qualification and Verification Testing of Fall Protection Products
ASSP Z359.11	(2014) Safety Requirements for Full Body Harnesses
ASSP Z359.12	(2019) Connecting Components for Personal Fall Arrest Systems
ASSP Z359.13	(2013) Personal Energy Absorbers and Energy Absorbing Lanyards
ASSP Z359.14	(2014) Safety Requirements for Self-Retracting Devices for Personal Fall Arrest and Rescue Systems
ASSP Z359.15	(2014) Safety Requirements for Single Anchor Lifelines and Fall Arresters for Personal Fall Arrest Systems
ASSP Z359.16	(2016) Safety Requirements for Climbing Ladder Fall Arrest Systems
ASSP Z359.18	(2017) Safety Requirements for Anchorage Connectors for Active Fall Protection Systems

ASTM INTERNATIONAL (ASTM)

ASTM F855	(2019) Standard Specifications for Temporary Protective Grounds to Be Used on De-energized Electric Power Lines and Equipment
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INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 1048	(2016) Guide for Protective Grounding of Power Lines
IEEE C2	(2017; Errata 1-2 2017; INT 1 2017) National Electrical Safety Code

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA Z535.2	(2011; R 2017) Environmental and Facility Safety Signs
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NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 10	(2018; ERTA 1-2 2018) Standard for Portable Fire Extinguishers
NFPA 51B	(2019; TIA 20-1) Standard for Fire Prevention During Welding, Cutting, and Other Hot Work
NFPA 70	(2020; ERTA 20-1 2020; ERTA 20-2 2020; TIA 20-1; TIA 20-2; TIA 20-3; TIA 20-4) National Electrical Code
NFPA 70E	(2021) Standard for Electrical Safety in the Workplace
NFPA 241	(2019) Standard for Safeguarding Construction, Alteration, and Demolition Operations
NFPA 306	(2019) Standard for the Control of Gas Hazards on Vessels

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual
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U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

10 CFR 20	Standards for Protection Against Radiation
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.146	Permit-required Confined Spaces
29 CFR 1910.147	The Control of Hazardous Energy (Lock Out/Tag Out)
29 CFR 1910.333	Selection and Use of Work Practices
29 CFR 1915	Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment
29 CFR 1915.89	Control of Hazardous Energy (Lockout/Tags-Plus)
29 CFR 1926	Safety and Health Regulations for Construction
29 CFR 1926.16	Rules of Construction
29 CFR 1926.450	Scaffolds
29 CFR 1926.500	Fall Protection
29 CFR 1926.1400	Cranes and Derricks in Construction

49 CFR 173	Shippers - General Requirements for Shipments and Packagings
CPL 02-01-056	(2014) Inspection Procedures for Accessing Communication Towers by Hoist
CPL 2.100	(1995) Application of the Permit-Required Confined Spaces (PRCS) Standards, 29 CFR 1910.146

1.2 DEFINITIONS

1.2.1 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 dangerous to personnel, and who has authorization to take prompt corrective measures with regards to such hazards.

1.2.2 Competent Person, Confined Space

The CP, Confined Space, is a person meeting the competent person requirements as defined EM 385-1-1 Appendix Q, with thorough knowledge of OSHA's Confined Space Standard, 29 CFR 1910.146, and designated in writing to be responsible for the immediate supervision, implementation and monitoring of the confined space program, who through training, knowledge and experience in confined space entry is capable of identifying, evaluating and addressing existing and potential confined space hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.3 Competent Person, Cranes and Rigging

The CP, Cranes and Rigging, as defined in EM 385-1-1 Appendix Q, is a person meeting the competent person, who has been designated in writing to be responsible for the immediate supervision, implementation and monitoring of the Crane and Rigging Program, who through training, knowledge and experience in crane and rigging is capable of identifying, evaluating and addressing existing and potential hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.4 Competent Person, Excavation/Trenching

A CP, Excavation/Trenching, is a person meeting the competent person requirements as defined in EM 385-1-1 Appendix Q and 29 CFR 1926, who has been designated in writing to be responsible for the immediate supervision, implementation and monitoring of the excavation/trenching program, who through training, knowledge and experience in excavation/trenching is capable of identifying, evaluating and addressing existing and potential hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.5 Competent Person, Fall Protection

The CP, Fall Protection, is a person meeting the competent person requirements as defined in EM 385-1-1 Appendix Q and in accordance with ASSP Z359.0, who has been designated in writing by the employer to be responsible for immediate supervising, implementing and monitoring of the

fall protection program, who through training, knowledge and experience in fall protection and rescue systems and equipment, is capable of identifying, evaluating and addressing existing and potential fall hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.6 Competent Person, Scaffolding

The CP, Scaffolding is a person meeting the competent person requirements in EM 385-1-1 Appendix Q, and designated in writing by the employer to be responsible for immediate supervising, implementing and monitoring of the scaffolding program. The CP for Scaffolding has enough training, knowledge and experience in scaffolding to correctly identify, evaluate and address existing and potential hazards and also has the authority to take prompt corrective measures with regard to these hazards. CP qualifications must be documented including experience on the specific scaffolding systems/types being used, assessment of the base material that the scaffold will be erected upon, load calculations for materials and personnel, and erection and dismantling. The CP for scaffolding must have a documented minimum of 8-hours of scaffold training to include training on the specific type of scaffold being used (e.g. mast-climbing, adjustable, tubular frame), in accordance with EM 385-1-1 Section 22.B.02.

1.2.7 Competent Person (CP) Trainer

A competent person trainer as defined in EM 385-1-1 Appendix Q, who is qualified in the training material presented, and who possesses a working knowledge of applicable technical regulations, standards, equipment and systems related to the subject matter on which they are training Competent Persons. A competent person trainer must be familiar with the typical hazards and the equipment used in the industry they are instructing. The training provided by the competent person trainer must be appropriate to that specific industry. The competent person trainer must evaluate the knowledge and skills of the competent persons as part of the training process.

1.2.8 High Risk Activities

High Risk Activities are activities that involve work at heights, crane and rigging, excavations and trenching, scaffolding, electrical work, and confined space entry.

1.2.9 High Visibility Accident

A High Visibility Accident is any mishap which may generate publicity or high visibility.

1.2.10 Load Handling Equipment (LHE)

LHE is a term used to describe cranes, hoists and all other hoisting equipment (hoisting equipment means equipment, including crane, derricks, hoists and power operated equipment used with rigging to raise, lower or horizontally move a load).

1.2.11 Medical Treatment

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

when provided by a physician or registered personnel.

1.2.12 Near Miss

A Near Miss is a mishap resulting in no personal injury and zero property damage, but given a shift in time or position, damage or injury may have occurred (e.g., a worker falls off a scaffold and is not injured; a crane swings around to move the load and narrowly misses a parked vehicle).

1.2.13 Operating Envelope

The Operating Envelope is the area surrounding any crane or load handling equipment. Inside this "envelope" is the crane, the operator, riggers and crane walkers, other personnel involved in the operation, rigging gear between the hook, the load, the crane's supporting structure (i.e. ground or rail), the load's rigging path, the lift and rigging procedure.

1.2.14 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.

1.2.15 Qualified Person, Fall Protection (QP for FP)

A QP for FP is a person meeting the definition requirements of EM 385-1-1 Appendix Q, and ASSP Z359.2 standard, having a recognized degree or professional certificate and with extensive knowledge, training and experience in the fall protection and rescue field who is capable of designing, analyzing, and evaluating and specifying fall protection and rescue systems.

1.2.16 Recordable Injuries or Illnesses

Recordable Injuries or Illnesses are any work-related injury or illness that results in:

- a. Death, regardless of the time between the injury and death, or the length of the illness;
- b. Days away from work (any time lost after day of injury/illness onset);
- c. Restricted work;
- d. Transfer to another job;
- e. Medical treatment beyond first aid;
- f. Loss of consciousness; or
- g. A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (a) through (f) above

1.2.17 Government Property and Equipment

Interpret "USACE" property and equipment specified in USACE EM 385-1-1 as

Government property and equipment.

1.2.18 Load Handling Equipment (LHE) Accident or Load Handling Equipment Mishap

A LHE accident occurs when any one or more of the eight elements in the operating envelope fails to perform correctly during operation, including operation during maintenance or testing resulting in personnel injury or death; material or equipment damage; dropped load; derailment; two-blocking; overload; or collision, including unplanned contact between the load, crane, or other objects. A dropped load, derailment, two-blocking, overload and collision are considered accidents, even though no material damage or injury occurs. A component failure (e.g., motor burnout, gear tooth failure, bearing failure) is not considered an accident solely due to material or equipment damage unless the component failure results in damage to other components (e.g., dropped boom, dropped load, or roll over). Document an LHE mishap or accident using the NAVFAC prescribed Navy Crane Center (NCC) accident form.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" classification. Submittals not having a "G" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Accident Prevention Plan (APP); G

APP - Construction; G

Accident Prevention Plan (APP); G

SD-06 Test Reports

Monthly Exposure Reports

Notifications and Reports

Accident Reports; G

LHE Inspection Reports

SD-07 Certificates

Contractor Safety Self-Evaluation Checklist

Crane Operators/Riggers

Standard Lift Plan; G

Critical Lift Plan; G

Activity Hazard Analysis (AHA)

Confined Space Entry Permit

Hot Work Permit

Certificate of Compliance

License Certificates

Radiography Operation Planning Work Sheet; G

Portable Gauge Operations Planning Worksheet; G

1.4 MONTHLY EXPOSURE REPORTS

Provide a Monthly Exposure Report and attach to the monthly billing request. 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 voucher.

1.5 CONTRACTOR SAFETY SELF-EVALUATION CHECKLIST

Contracting Officer will provide a "Contractor Safety Self-Evaluation checklist" to the Contractor at the pre-construction meeting. Complete the checklist monthly and submit with each request for payment voucher. 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/ffc/dod/unified-facilities-guide-specifications-ufgs/ufgs-01-35-26

1.6 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. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements govern.

1.6.1 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.

1.6.1.1 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.

1.6.1.2 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:

$$(N/EH) \times 200,000$$

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.

1.7 SITE QUALIFICATIONS, DUTIES, AND MEETINGS

1.7.1 Personnel Qualifications

1.7.1.1 Site Safety and Health Officer (SSHO)

Provide an SSHO that meets the requirements of EM 385-1-1 Section 1. The SSHO must ensure that the requirements of 29 CFR 1926.16 are met for the project. Provide a Safety oversight team that includes a minimum of one person at each project site to function as the Site Safety and Health Officer (SSHO). The SSHO or an equally-qualified Alternate SSHO must be at the work site at all times to implement and administer the Contractor's safety program and Government-accepted Accident Prevention Plan. The SSHO and Alternate SSHO must have the required training, experience, and qualifications in accordance with EM 385-1-1 Section 01.A.17, and all associated sub-paragraphs.

If the SSHO is off-site for a period longer than 24 hours, an equally-qualified alternate SSHO must be provided and must fulfill the same roles and responsibilities as the primary SSHO. When the SSHO is temporarily (up to 24 hours) off-site, a Designated Representative (DR), as identified in the AHA may be used in lieu of an Alternate SSHO, and must be on the project site at all times when work is being performed.

Note that the DR is a collateral duty safety position, with safety duties in addition to their full time occupation.

1.7.1.1.1 Additional Site Safety and Health Officer (SSHO) Requirements and Duties

The SSHO may also serve as the Quality Control Manager. The SSHO may not serve as the Superintendent.

1.7.1.2 Competent Person Qualifications

Provide Competent Persons in accordance with EM 385-1-1, Appendix Q and herein. Competent Persons for high risk activities include confined space, cranes and rigging, excavation/trenching, fall protection, and electrical work. The CP for these activities must be designated in writing, and meet the requirements for the specific activity (i.e. competent person, fall protection).

The Competent Person identified in the Contractor's Safety and Health Program and accepted Accident Prevention Plan, must be on-site at all times when the work that presents the hazards associated with their professional expertise is being performed. Provide the credentials of the Competent Persons(s) to the Contracting Officer for information in consultation with the Safety Office.

1.7.1.2.1 Competent Person for Confined Space Entry

Provide a Confined Space (CP) Competent Person who meets the requirements of EM 385-1-1, Appendix Q, and herein. The CP for Confined Space Entry must supervise the entry into each confined space in accordance with EM 385-1-1, Section 34.

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, OSHA 29 CFR 1915, Subpart B, "Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment," or as applicable, 29 CFR 1910.147 for general industry.

1.7.1.2.2 Competent Person for Scaffolding

Provide a Competent Person for Scaffolding who meets the requirements of EM 385-1-1, Section 22.B.02 and herein.

1.7.1.2.3 Competent Person for Fall Protection

Provide a Competent Person for Fall Protection who meets the requirements of EM 385-1-1, Section 21.C.04, 21.B.03, and herein.

1.7.1.3 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, 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 1926.450, Subpart L.

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 five 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.

1.7.1.4 Crane Operators/Riggers

Provide Operators, Signal Persons, and Riggers meeting the requirements in EM 385-1-1, Section 15.B for Riggers and Section 16.B for Crane Operators and Signal Persons. In addition, for mobile cranes with Original Equipment Manufacturer (OEM) rated capacities of 50,000 pounds or greater, designate crane operators qualified by a source that qualifies crane operators (i.e., union, a Government agency, or an organization that tests and qualifies crane operators). Provide proof of current qualification.

1.7.2 Personnel Duties

1.7.2.1 Duties of the Site Safety and Health Officer (SSHO)

The SSHO must:

- a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Attach safety inspection logs to the Contractors' daily production report.
- b. Conduct mishap investigations and complete required accident reports. Report mishaps and near misses.
- c. Use and maintain OSHA's Form 300 to log work-related injuries and illnesses occurring on the project site for Prime Contractors and subcontractors, and make available to the Contracting Officer upon request. Post and maintain the Form 300A on the site Safety Bulletin Board.
- d. Maintain applicable safety reference material on the job site.
- e. Attend the pre-construction meeting, pre-work meetings including preparatory meetings, and periodic in-progress meetings.

- f. Review the APP and AHAs for compliance with EM 385-1-1, and approve, sign, implement and enforce them.
- g. Establish a Safety and Occupational Health (SOH) Deficiency Tracking System that lists and monitors outstanding deficiencies until resolution.
- h. Ensure subcontractor compliance with safety and health requirements.
- i. Maintain a list of hazardous chemicals on site and their material Safety Data Sheets (SDS).
- j. Maintain a weekly list of high hazard activities involving energy, equipment, excavation, entry into confined space, and elevation, and be prepared to discuss details during QC Meetings.
- k. Provide and keep a record of site safety orientation and indoctrination for Contractor employees, subcontractor employees, and site visitors.

Superintendent, QC Manager, and SSO are subject to dismissal if the above or any other required duties are not being effectively carried out. If either the Superintendent, QC Manager, or SSO 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.

1.7.3 Meetings

1.7.3.1 Preconstruction Meeting

- a. Contractor representatives who have a responsibility or significant role in accident prevention on the project must attend the preconstruction meeting. 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.
- 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.

1.7.3.2 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, foremen, or CDSOs 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 ACCIDENT PREVENTION PLAN (APP)

Provide a site-specific Accident Prevention Plan (APP), including Activity Hazard Analyses (AHA), in accordance with EM 385-1-1 Appendix A, 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. Field work may not begin until the design APP is accepted by the Contracting Officer.

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.

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.

1.8.1 APP - Construction

A qualified person must prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of EM 385-1-1, Appendix A, and as supplemented herein. Cover all paragraph and subparagraph elements in EM 385-1-1, Appendix A. 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 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 authority" for all work site safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the Contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out. The APP must be signed by an officer of the firm (Prime Contractor senior person), the individual preparing the APP, the on-site superintendent, the designated SSHO, the Contractor Quality Control Manager, and any designated Certified Safety Professional (CSP) or Certified Health Physicist (CIH). 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 meeting 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 ASSP A10.34), and the environment.

1.8.2 Names and Qualifications

Provide plans in accordance with the requirements outlined in Appendix A of 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. Qualifications of competent and of qualified persons. As a minimum, designate and submit qualifications of competent persons for each of the following major areas: excavation; scaffolding; fall protection; hazardous energy; confined space; health hazard recognition, evaluation and control of chemical, physical and biological agents; and personal protective equipment and clothing to include selection, use and maintenance.

1.8.3 Plans

Provide plans in the APP in accordance with the requirements outlined in Appendix A of EM 385-1-1, including the following:

1.8.3.1 Confined Space Entry Plan

Develop a confined or enclosed space entry plan in accordance with EM 385-1-1, applicable OSHA standards 29 CFR 1910, 29 CFR 1915, and 29 CFR 1926, OSHA Directive CPL 2.100, and any other federal, state and local regulatory requirements identified in this Contract. Identify the qualified person's name and qualifications, training, and experience. Delineate the qualified person's authority to direct work stoppage in the event of hazardous conditions. Include procedure for rescue by Contractor personnel and the coordination with emergency responders. (If there is no confined space work, include a statement that no confined space work

exists and none will be created.)

1.8.3.2 Standard Lift Plan (SLP)

Plan lifts to avoid situations where the operator cannot maintain safe control of the lift. Prepare a written SLP in accordance with EM 385-1-1, Section 16.A.03, using Form 16-2 for every lift or series of lifts (if duty cycle or routine lifts are being performed). The SLP must be developed, reviewed and accepted by all personnel involved in the lift in conjunction with the associated AHA. Signature on the AHA constitutes acceptance of the plan. Maintain the SLP on the LHE for the current lift(s) being made. Maintain historical SLPs for a minimum of three months.

1.8.3.3 Critical Lift Plan - Crane or Load Handling Equipment

Provide a Critical Lift Plan as required by EM 385-1-1, Section 16.H.01, using Form 16-3. In addition, Critical Lift Plans are required for the following:

- a. Lifts over 50 percent of the capacity of barge mounted mobile crane's hoist.
- b. When working around energized power lines where the work will get closer than the minimum clearance distance in EM 385-1-1 Table 16-1.
- c. For lifts with anticipated binding conditions.
- d. When erecting cranes.

1.8.3.3.1 Critical Lift Plan Planning and Schedule

Critical lifts require detailed planning and additional or unusual safety precautions. Develop and submit a critical lift plan to the Contracting Officer 30 calendar days prior to critical lift. Comply with load testing requirements in accordance with EM 385-1-1, Section 16.F.03.

1.8.3.3.2 Lifts of Personnel

In addition to the requirements of EM 385-1-1, Section 16.H.02, for lifts of personnel, demonstrate compliance with the requirements of 29 CFR 1926.1400 and EM 385-1-1, Section 16.T.

1.8.3.4 Multi-Purpose Machines, Material Handling Equipment, and Construction Equipment Lift Plan

Multi-purpose machines, material handling equipment, and construction equipment used to lift loads that are suspended by rigging gear, require proof of authorization from the machine OEM that the machine is capable of making lifts of loads suspended by rigging equipment. Written approval from a qualified registered professional engineer, after a safety analysis is performed, is allowed in lieu of the OEM's approval. Demonstrate that the operator is properly trained and that the equipment is properly configured to make such lifts and is equipped with a load chart.

1.8.3.5 Fall Protection and Prevention (FP&P) Plan

The plan must be in accordance with the requirements of EM 385-1-1, Section 21.D and ASSP Z359.2, be site specific, and address all fall

hazards in the work place and during different phases of construction. Address how to protect and prevent workers from falling to lower levels when they are exposed to fall hazards above 6 feet. A competent person or qualified person for fall protection must prepare and sign the plan documentation. Include fall protection and prevention systems, equipment and methods employed for every phase of work, roles and responsibilities, assisted rescue, self-rescue and evacuation procedures, training requirements, and monitoring methods. Review and revise, as necessary, the Fall Protection and Prevention Plan documentation as conditions change, but at a minimum every six months, for lengthy projects, reflecting any changes during the course of construction due to changes in personnel, equipment, systems or work habits. Keep and maintain the accepted Fall Protection and Prevention Plan documentation at the job site for the duration of the project. Include the Fall Protection and Prevention Plan documentation in the Accident Prevention Plan (APP).

1.8.3.6 Rescue and Evacuation Plan

Provide a Rescue and Evacuation Plan in accordance with EM 385-1-1 Section 21.N and ASSP Z359.2, and include in the FP&P Plan and as part of the APP. Include a detailed discussion of the following: methods of rescue; methods of self-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility.

1.8.3.7 Hazardous Energy Control Program (HECP)

Develop a HECP in accordance with EM 385-1-1 Section 12, 29 CFR 1910.147, 29 CFR 1910.333, 29 CFR 1915.89, ASSP Z244.1, and ASSP A10.44. Submit this HECP as part of the Accident Prevention Plan (APP). Conduct a preparatory meeting and inspection with all effected personnel to coordinate all HECP activities. Document this meeting and inspection in accordance with EM 385-1-1, Section 12.A.02. Ensure that each employee is familiar with and complies with these procedures.

1.8.3.8 Excavation Plan

Identify the safety and health aspects of excavation, and provide and prepare the plan in accordance with EM 385-1-1, Section 25.A and Section 31 00 00 EARTHWORK.

1.8.3.9 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.

1.9 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, Section 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 DFOV. 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.

1.9.1 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.

1.9.2 AHA Signature Log

Each employee performing work as part of an activity, task or DFOV 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.

1.10 DISPLAY OF SAFETY INFORMATION

1.10.1 Safety Bulletin Board

Prior to commencement of work, erect a safety bulletin board at the job site. Where size, duration, or logistics of project do not facilitate a bulletin board, an alternative method, acceptable to the Contracting Officer, that is accessible and includes all mandatory information for employee and visitor review, may be deemed as meeting the requirement for a bulletin board. Include and maintain information on safety bulletin board as required by EM 385-1-1, Section 01.A.07. Additional items required to be posted include:

- a. Confined space entry permit.
- b. Hot work permit.

1.10.2 Safety and Occupational Health (SOH) Deficiency Tracking System

Establish a SOH deficiency tracking system that lists and monitors the status of SOH deficiencies in chronological order. Use the tracking system to evaluate the effectiveness of the APP. A monthly evaluation of the data must be discussed in the QC or SOH meeting with everyone on the project. The list must be posted on the project bulletin board and updated daily, and provide the following information:

- a. Date deficiency identified;
- b. Description of deficiency;
- c. Name of person responsible for correcting deficiency;

- d. Projected resolution date;
- e. Date actually resolved.

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. Government has no responsibility to provide emergency medical treatment.

1.13 NOTIFICATIONS and REPORTS

1.13.1 Mishap Notification

Notify the Contracting Officer as soon as practical, but no more than twenty-four hours, after any mishaps, including recordable accidents, incidents, and near misses, as defined in EM 385-1-1 Appendix Q, any report of injury, illness, or any property damage. For LHE or rigging mishaps, notify the Contracting Officer as soon as practical but not more than four hours after mishap. The Contractor is responsible for obtaining appropriate medical and emergency assistance and for notifying fire, law enforcement, and regulatory agencies. Immediate reporting is required for electrical mishaps, to include Arc Flash; shock; uncontrolled release of hazardous energy (includes electrical and non-electrical); load handling equipment or rigging; fall from height (any level other than same surface); and underwater diving. These mishaps must be investigated in depth to identify all causes and to recommend hazard control measures.

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 mishap.

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 5 days for mishaps defined in EM 385-1-1 01.D.03 and 10 days for accidents defined by EM 385-1-1 01.D.05. Complete an investigation report within 30 days for those mishaps defined by EM 385-1-1 01.D.04. Mishaps defined by EM 385-1-1 01.D.04 and 01.D.05 must include a written report submitted as an attachment in ESAMS using the following outline: (1) Mishap summary

description to include process, findings and outcomes; (2) Root Cause; (3) Direct Factors; (4) Indirect and Contributing Factors; (5) Corrective Actions; and (6) Recommendations. The Contracting Officer will provide copies of any required or special forms.

- b. 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.
- c. Conduct an accident investigation for any load handling equipment accident (including rigging accidents) to establish the root cause(s) of the accident. Complete the 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

Provide a FORM 16-1 Certificate of Compliance for LHE entering an activity under this Contract and in accordance with EM 385-1-1. Post certifications on the crane.

Develop a Standard Lift Plan (SLP) in accordance with EM 385-1-1, Section 16.H.03 using Form 16-2 Standard Pre-Lift Crane Plan/Checklist for each lift planned. Submit SLP to the Contracting Officer for approval within 15 calendar days in advance of planned lift.

1.14 HOT WORK

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 Department. 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 one 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 Department phone number. REPORT ANY FIRE, NO MATTER HOW SMALL, TO THE RESPONSIBLE FIRE DEPARTMENT IMMEDIATELY.

1.14.2 Work Around Flammable Materials

Obtain permit approval from a NFPA Certified Marine Chemist 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, Section 06.H

1.15 RADIATION SAFETY REQUIREMENTS

Submit License Certificates, employee training records, and Leak Test Reports for radiation materials and equipment to the Contracting Officer and Radiation Safety Office (RSO), and Contracting Oversight Technician (COT) for all specialized and licensed material and equipment proposed for use on the construction project (excludes portable machine sources of ionizing radiation including moisture density and X-Ray Fluorescence (XRF)). Maintain on-site records whenever licensed radiological materials or ionizing equipment are on Government property.

Protect workers from radiation exposure in accordance with 10 CFR 20, ensuring any personnel exposures are maintained As Low As Reasonably Achievable.

1.15.1 Radiography Operation Planning Work Sheet

Submit a Gamma and X-Ray Radiography Operation Planning Work Sheet to Contracting Officer 14 days prior to commencement of operations involving radioactive materials or radiation generating devices. For portable machine sources of ionizing radiation, including moisture density and XRF, use and submit the Portable Gauge Operations Planning Worksheet instead. The Contracting Officer and COT will review the submitted worksheet and provide questions and comments.

Contractors must use primary dosimeters process by a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory.

1.15.2 Site Access and Security

Coordinate site access and security requirements with the Contracting Officer and COT for all radiological materials and equipment containing ionizing radiation that are proposed for use on a government facility. For gamma radiography materials and equipment, a Government escort is required for any travels on the Installation. The Navy COT or Government authorized representative will meet the Contractor at a designated location outside the Installation, ensure safety of the materials being transported, and will escort the Contractor for gamma sources onto the Installation, to the job site, and off the Installation. For portable machine sources of ionizing radiation, including moisture density and XRF, the Navy COT or Government authorized representative will meet the Contractor at the job site.

Provide a copy of all calibration records, and utilization records to the COT for radiological operations performed on the site.

1.15.3 Loss or Release and Unplanned Personnel Exposure

Loss or release of radioactive materials, and unplanned personnel exposures must be reported immediately to the Contracting Officer, RSO, and Base Security Department Emergency Number.

1.15.4 Site Demarcation and Barricade

Properly demark and barricade an area surrounding radiological operations to preclude personnel entrance, in accordance with EM 385-1-1, Nuclear Regulatory Commission, and Applicable State regulations and license requirements, and in accordance with requirements established in the accepted Radiography Operation Planning Work Sheet.

Do not close or obstruct streets, walks, and other facilities occupied and used by the Government without written permission from the Contracting Officer.

1.15.5 Security of Material and Equipment

Properly secure the radiological material and ionizing radiation equipment at all times, including keeping the devices in a properly marked and locked container, and secondarily locking the container to a secure point in the Contractor's vehicle or other approved storage location during transportation and while not in use. While in use, maintain a continuous visual observation on the radiological material and ionizing radiation equipment. In instances where radiography is scheduled near or adjacent to buildings or areas having limited access or one-way doors, make no assumptions as to building occupancy. Where necessary, the Contracting Officer will direct the Contractor to conduct an actual building entry, search, and alert. Where removal of personnel from such a building cannot be accomplished and it is otherwise safe to proceed with the radiography, position a fully instructed employee inside the building or area to prevent exiting while external radiographic operations are in process.

1.15.6 Transportation of Material

Comply with 49 CFR 173 for Transportation of Regulated Amounts of Radioactive Material. Notify Local Fire authorities and the site Radiation Safety Officer (RSO) of any Radioactive Material use.

1.15.7 Schedule for Exposure or Unshielding

Actual exposure of the radiographic film or unshielding the source must not be initiated until after 5 p.m. on weekdays.

1.15.8 Transmitter Requirements

Adhere to the base policy concerning the use of transmitters, such as radios and cell phones. Obey Emissions control (EMCON) restrictions.

1.16 CONFINED SPACE ENTRY REQUIREMENTS

Confined space entry must comply with Section 34 of EM 385-1-1, OSHA 29 CFR 1926, OSHA 29 CFR 1910, OSHA 29 CFR 1910.146, and OSHA Directive CPL 2.100. Any potential for a hazard in the confined space requires a

permit system to be used.

1.16.1 Entry Procedures

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

1.16.2 Forced Air Ventilation

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

1.16.3 Sewer Wet Wells

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

1.16.4 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.

1.17 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. Hard Hat
- b. Long Pants
- c. Appropriate Safety Shoes
- 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 may be hazardous to human health upon disturbance are encountered during construction operations, stop that portion of work and notify the Contracting Officer immediately. Within 14 calendar days the Government will determine if the material is hazardous. If material is not hazardous or poses no danger, the Government will direct the Contractor to proceed without change. If material is hazardous and handling of the material is necessary to accomplish the work, the Government will issue a modification pursuant to FAR 52.243-4 Changes and FAR 52.236-2 Differing Site Conditions.

3.2 UTILITY OUTAGE REQUIREMENTS

Apply for utility outages at least 14 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, Section 11.A.02 (Isolation). Some examples of energy isolation devices and procedures are highlighted in EM 385-1-1, Section 12.D. In accordance with EM 385-1-1, Section 12.A.01, 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 HEC and HEC procedures, as well as applicable Activity Hazard Analyses (AHAs). In accordance with EM 385-1-1, Section 11.A.02 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, Section 12.A. This meeting must include the Prime Contractor, the Prime and subcontractors performing the work, the Contracting Officer, and the Installation 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 HEC training in accordance with EM 385-1-1, Section 12.C. 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 Section 12, 29 CFR 1910.333, 29 CFR 1915.89, ASSP A10.44, NFPA 70E, and paragraph HAZARDOUS ENERGY CONTROL PROGRAM (HECP).

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, Section 12.A.02. 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, Sections 05.I and 11.B. Install personal protective grounds, with tags, to eliminate the potential for induced voltage in accordance with EM 385-1-1, Section 12.E.06.

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, Section 12.E.08, 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 ASSP Z359.2 and EM 385-1-1, Sections 21.A and 21.D.

3.5.1 Training

Institute a fall protection training program. As part of the Fall Protection Program, provide training for each employee who might be exposed to fall hazards and using personal fall protection equipment. Provide training by a competent person for fall protection in accordance with EM 385-1-1, Section 21.C. Document training and practical application of the competent person in accordance with EM 385-1-1, Section 21.C.04 and ASSP Z359.2 in the AHA.

3.5.2 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, Section 21.

Provide personal fall protection equipment, systems, subsystems, and components that comply with EM 385-1-1 Section 21.I, 29 CFR 1926.500 Subpart M, ASSP Z359.0, ASSP Z359.1, ASSP Z359.2, ASSP Z359.3, ASSP Z359.4, ASSP Z359.6, ASSP Z359.7, ASSP Z359.11, ASSP Z359.12, ASSP Z359.13, ASSP Z359.14, ASSP Z359.15, ASSP Z359.16 and ASSP Z359.18.

3.5.2.1 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, Sections 21.0 through 21.0.06. 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.

3.5.2.2 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, Section 21.I.06.

3.5.3 Fall Protection for Roofing Work

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

a. Low Sloped Roofs:

- (1) For work within 6 feet from unprotected edge of a roof having a slope less than or equal to 4:12 (vertical to horizontal), protect

personnel from falling by the use of conventional fall protection systems (personal fall arrest/restraint systems, guardrails, or safety nets) in accordance with EM 385-1-1, Section 21 and 29 CFR 1926.500. A safety monitoring system is not adequate fall protection and is not authorized.

- (2) For work greater than 6 feet from the unprotected roof edge, addition to the use of conventional fall protection systems the use of a warning line system is also permitted, in accordance with 29 CFR 1926.500 and EM 385-1-1, Section 21.L.

- b. Steep-Sloped Roofs: Work on a roof having a slope greater than 4:12 (vertical to horizontal) requires a personal fall arrest system, guardrails with toe-boards, or safety nets. This requirement also applies to residential or housing type construction.

3.5.4 Horizontal Lifelines (HLL)

Provide HLL in accordance with EM 385-1-1, Section 21.I.08.d.2. Commercially manufactured horizontal lifelines (HLL) must be designed, installed, certified and used, under the supervision of a qualified person, for fall protection as part of a complete fall arrest system which maintains a safety factor of 2 (29 CFR 1926.500). The competent person for fall protection may (if deemed appropriate by the qualified person) supervise the assembly, disassembly, use and inspection of the HLL system under the direction of the qualified person. Locally manufactured HLLs are not acceptable unless they are custom designed for limited or site specific applications by a Registered Professional Engineer who is qualified in designing HLL systems.

3.5.5 Guardrails and Safety Nets

Design, install and use guardrails and safety nets in accordance with EM 385-1-1, Section 21.F.01 and 29 CFR 1926 Subpart M.

3.5.6 Rescue and Evacuation Plan and Procedures

When personal fall arrest systems are used, ensure that the mishap victim can self-rescue or can be rescued promptly should a fall occur. Prepare a Rescue and Evacuation Plan and include a detailed discussion of the following: methods of rescue; methods of self-rescue or assisted-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility. Include the Rescue and Evacuation Plan within the Activity Hazard Analysis (AHA) for the phase of work, in the Fall Protection and Prevention (FP&P) Plan, and the Accident Prevention Plan (APP). The plan must be in accordance with the requirements of EM 385-1-1, ASSP Z359.2, and ASSP Z359.4.

3.6 WORK PLATFORMS

3.6.1 Scaffolding

Provide employees with a safe means of access to the work area on the scaffold. Climbing of any scaffold braces or supports not specifically designed for access is prohibited. Comply with the following requirements:

- a. Scaffold platforms greater than 20 feet in height must be accessed by use of a scaffold stair system.

- b. Ladders commonly provided by scaffold system manufacturers are prohibited for accessing scaffold platforms greater than 20 feet maximum in height.
- c. An adequate gate is required.
- d. Employees performing scaffold erection and dismantling must be qualified.
- e. Scaffold must be capable of supporting at least four times the maximum intended load, and provide appropriate fall protection as delineated in the accepted fall protection and prevention plan.
- f. Stationary scaffolds must be attached to structural building components to safeguard against tipping forward or backward.
- g. Special care must be given to ensure scaffold systems are not overloaded.
- h. Side brackets used to extend scaffold platforms on self-supported scaffold systems for the storage of material are prohibited. The first tie-in must be at the height equal to 4 times the width of the smallest dimension of the scaffold base.
- i. Scaffolding other than suspended types must bear on base plates upon wood mudsills (2 in x 10 in x 8 in minimum) or other adequate firm foundation.
- j. Scaffold or work platform erectors must have fall protection during the erection and dismantling of scaffolding or work platforms that are more than 6 feet.
- k. Delineate fall protection requirements when working above 6 feet or above dangerous operations in the Fall Protection and Prevention (FP&P) Plan and Activity Hazard Analysis (AHA) for the phase of work.

3.6.2 Elevated Aerial Work Platforms (AWPs)

Workers must be anchored to the basket or bucket in accordance with manufacturer's specifications and instructions (anchoring to the boom may only be used when allowed by the manufacturer and permitted by the CP). Lanyards used must be sufficiently short to prohibit worker from climbing out of basket. The climbing of rails is prohibited. Lanyards with built-in shock absorbers are acceptable. Self-retracting devices are not acceptable. Tying off to an adjacent pole or structure is not permitted unless a safe device for 100 percent tie-off is used for the transfer.

Use of AWPs must be operated, inspected, and maintained as specified in the operating manual for the equipment and delineated in the AHA. Operators of AWPs must be designated as qualified operators by the Prime Contractor. Maintain proof of qualifications on site for review and include in the AHA.

3.7 EQUIPMENT

3.7.1 Material Handling Equipment (MHE)

- a. Material handling equipment such as forklifts must not be modified

with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions. Material handling equipment fitted with personnel work platform attachments are prohibited from traveling or positioning while personnel are working on the platform.

- b. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions. Material Handling Equipment Operators must be trained in accordance with OSHA 29 CFR 1910, Subpart N.
- c. Operators of forklifts or power industrial trucks must be licensed in accordance with OSHA.

3.7.2 Load Handling Equipment (LHE)

The following requirements apply. In exception, these requirements do not apply to commercial truck mounted and articulating boom cranes used solely to deliver material and supplies (not prefabricated components, structural steel, or components of a systems-engineered metal building) where the lift consists of moving materials and supplies from a truck or trailer to the ground; to cranes installed on mechanics trucks that are used solely in the repair of shore-based equipment; to crane that enter the activity but are not used for lifting; nor to other machines not used to lift loads suspended by rigging equipment. However, LHE accidents occurring during such operations must be reported.

- a. Equip cranes and derricks as specified in EM 385-1-1, Section 16.
- b. Notify the Contracting Officer 15 working days in advance of any LHE entering the activity, in accordance with EM 385-1-1, Section 16.A.02, so that necessary quality assurance spot checks can be coordinated. Prior to cranes entering federal activities, a Crane Access Permit must be obtained from the Contracting Officer. A copy of the permitting process will be provided at the Preconstruction Meeting. Contractor's operator must remain with the crane during the spot check. Rigging gear must be in accordance with OSHA, ASME B30.9 Standards safety standards.
- c. Comply with the LHE manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Perform erection under the supervision of a designated person (as defined in ASME B30.5). Perform all testing in accordance with the manufacturer's recommended procedures.
- d. Comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, ASME B30.8 for floating cranes and floating derricks, ASME B30.9 for slings, ASME B30.20 for below the hook lifting devices and ASME B30.26 for rigging hardware.
- e. When operating in the vicinity of overhead transmission lines, operators and riggers must be alert to this special hazard and follow the requirements of EM 385-1-1 Section 11, and ASME B30.5 or ASME B30.22 as applicable.
- f. Do not use crane suspended personnel work platforms (baskets) unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Do

not lift personnel with a line hoist or friction crane. Additionally, submit a specific AHA for this work to the Contracting Officer. Ensure the activity and AHA are thoroughly reviewed by all involved personnel.

- g. Inspect, maintain, and recharge portable fire extinguishers as specified in NFPA 10, Standard for Portable Fire Extinguishers.
- h. All employees must keep clear of loads about to be lifted and of suspended loads, except for employees required to handle the load.
- i. Use cribbing when performing lifts on outriggers.
- j. The crane hook/block must be positioned directly over the load. Side loading of the crane is prohibited.
- k. A physical barricade must be positioned to prevent personnel access where accessible areas of the LHE's rotating superstructure poses a risk of striking, pinching or crushing personnel.
- l. Maintain inspection records in accordance by EM 385-1-1, Section 16.D, including shift, monthly, and annual inspections, the signature of the person performing the inspection, and the serial number or other identifier of the LHE that was inspected. Records must be available for review by the Contracting Officer.
- m. Maintain written reports of operational and load testing in accordance with EM 385-1-1, Section 16.F, listing the load test procedures used along with any repairs or alterations performed on the LHE. Reports must be available for review by the Contracting Officer.
- n. Certify that all LHE operators have been trained in proper use of all safety devices (e.g. anti-two block devices).
- o. Take steps to ensure that wind speed does not contribute to loss of control of the load during lifting operations. At wind speeds greater than 20 mph, the operator, rigger and lift supervisor must cease all crane operations, evaluate conditions and determine if the lift may proceed. Base the determination to proceed or not on wind calculations per the manufacturer and a reduction in LHE rated capacity if applicable. Include this maximum wind speed determination as part of the activity hazard analysis plan for that operation.
- p. On mobile cranes, lifts where the load weight is greater than 90 percent of the equipment's capacity are prohibited.
- q. Follow FAA guidelines when required based on project location.

3.7.3 Machinery and Mechanized Equipment

- a. Proof of qualifications for operator must be kept on the project site for review.
- b. Manufacture specifications or owner's manual for the equipment must be on-site and reviewed for additional safety precautions or requirements that are sometimes not identified by OSHA or USACE EM 385-1-1. Incorporate such additional safety precautions or requirements into the AHAs.

3.7.4 Base Mounted Drum Hoists

- a. Operation of base mounted drum hoists must be in accordance with EM 385-1-1 and ASSP A10.22.
- b. Rigging gear must be in accordance with applicable ASME/OSHA standards.
- c. When used to hoist personnel, the AHA must include a written standard operating procedure. Operators must have a physical examination in accordance with EM 385-1-1 Section 16.B.05 and trained, at a minimum, in accordance with EM 385-1-1 Section 16.U and 16.T. The base mounted drum hoist must also comply with OSHA Instruction CPL 02-01-056 and ASME B30.23.
- d. Material and personnel must not be hoisted simultaneously.
- e. Personnel cage must be marked with the capacity (in number of persons) and load limit in pounds.
- f. Construction equipment must not be used for hoisting material or personnel or with trolley/tag lines. Construction equipment may be used for towing and assisting with anchoring guy lines.

3.7.5 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.

3.8 EXCAVATIONS

Soil classification must be performed by a competent person in accordance with 29 CFR 1926 and EM 385-1-1.

3.8.1 Utility Locations

Provide a third party, independent, private utility locating company to positively identify underground utilities in the work area in addition to any station locating service and coordinated with the station utility department.

3.8.2 Utility Location Verification

Physically verify underground utility locations, including utility depth, by hand digging using wood or fiberglass handled tools when any adjacent construction work is expected to come within 3 feet of the underground system.

3.8.3 Utilities Within and Under Concrete, Bituminous Asphalt, and Other Impervious Surfaces

Utilities located within and under concrete slabs or pier structures, bridges, parking areas, and the like, are extremely difficult to

identify. Whenever Contract work involves chipping, saw cutting, or core drilling through concrete, bituminous asphalt or other impervious surfaces, the existing utility location must be coordinated with station utility departments in addition to location and depth verification by a third party, independent, private locating company. The third party, independent, private locating company must locate utility depth by use of Ground Penetrating Radar (GPR), X-ray, bore scope, or ultrasound prior to the start of demolition and construction. Outages to isolate utility systems must be used in circumstances where utilities are unable to be positively identified. The use of historical drawings does not alleviate the Contractor from meeting this requirement.

3.9 ELECTRICAL

Perform electrical work in accordance with EM 385-1-1, Sections 11 and 12.

3.9.1 Conduct of Electrical Work

As delineated 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 shoes, 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 1910.147.

3.9.2 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.

3.9.3 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.

3.9.4 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.

Check grounding circuits to ensure that the circuit between the ground and a grounded power conductor has a resistance low enough to permit sufficient current flow to allow the fuse or circuit breaker to interrupt the current.

3.9.5 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 42 00

SOURCES FOR REFERENCE PUBLICATIONS

02/19

PART 1 GENERAL

1.1 REFERENCES

Various publications are referenced in other sections of the specifications to establish requirements for the work. These references are identified in each section by document number, date and title. The document number used in the citation is the number assigned by the standards producing organization (e.g., ASTM B564 Standard Specification for Nickel Alloy Forgings). However, when the standards producing organization has not assigned a number to a document, an identifying number has been assigned for reference purposes.

1.2 ORDERING INFORMATION

The addresses of the standards publishing organizations whose documents are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)
1791 Tullie Circle, NE
Atlanta, GA 30329
Ph: 404-636-8400 or 800-527-4723
Fax: 404-321-5478
E-mail: ashrae@ashrae.org
Internet: <https://www.ashrae.org/>

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)
Two Park Avenue
New York, NY 10016-5990
Ph: 800-843-2763
Fax: 973-882-1717
E-mail: customercare@asme.org
Internet: <https://www.asme.org/>

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)
520 N. Northwest Highway
Park Ridge, IL 60068
Ph: 847-699-2929
E-mail: customerservice@assp.org
Internet: <https://www.assp.org/>

AMERICAN WATER WORKS ASSOCIATION (AWWA)
6666 W. Quincy Avenue
Denver, CO 80235 USA
Ph: 303-794-7711 or 800-926-7337
Fax: 303-347-0804
Internet: <https://www.awwa.org/>

ASTM INTERNATIONAL (ASTM)
100 Barr Harbor Drive, P.O. Box C700

West Conshohocken, PA 19428-2959
Ph: 610-832-9500
Fax: 610-832-9555
E-mail: service@astm.org
Internet: <https://www.astm.org/>

GREEN SEAL (GS)
1001 Connecticut Avenue, NW
Suite 827
Washington, DC 20036-5525
Ph: 202-872-6400
Fax: 202-872-4324
E-mail: green seal@green seal.org
Internet: <https://www.green seal.org/>

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
445 and 501 Hoes Lane
Piscataway, NJ 08854-4141
Ph: 732-981-0060 or 800-701-4333
Fax: 732-981-9667
E-mail: onlinesupport@ieee.org
Internet: <https://www.ieee.org/>

INTERNATIONAL CODE COUNCIL (ICC)
500 New Jersey Avenue, NW
6th Floor, Washington, DC 20001
Ph: 800-786-4452 or 888-422-7233
Fax: 202-783-2348
E-mail: order@iccsafe.org
Internet: <https://www.iccsafe.org/>

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)
1300 North 17th Street, Suite 900
Arlington, VA 22209
Ph: 703-841-3200
Internet: <https://www.nema.org>

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
1 Batterymarch Park
Quincy, MA 02169-7471
Ph: 800-344-3555
Fax: 800-593-6372
Internet: <https://www.nfpa.org>

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION
(SMACNA)
4201 Lafayette Center Drive
Chantilly, VA 20151-1219
Ph: 703-803-2980
Fax: 703-803-3732
Internet: <https://www.smacna.org/>

STATE OF VIRGINIA ADMINISTRATIVE CODE (VAC)
900 E. Main Street
Pocahontas Building
Richmond, Virginia 23219
Ph: 804-698-1810

E-mail: codes@dls.virginia.gov
Internet: <http://register.dls.virginia.gov>

U.S. ARMY CORPS OF ENGINEERS (USACE)
CRD-C DOCUMENTS available on Internet:
<http://www.wbdg.org/ffc/army-coe/standards>
Order Other Documents from:
Official Publications of the Headquarters, USACE
E-mail: hqpublications@usace.army.mil
Internet: <http://www.publications.usace.army.mil/>
or
<https://www.hnc.usace.army.mil/Missions/Engineering-Directorate/TECHINFO/>

U.S. CODE (USC)
Office of the Law Revision Counsel
U.S. House of Representatives
H2-308 Ford House Office Building
Washington, DC 20515
Ph: 202-226-2411
E-mail: uscode@mail.house.gov
Internet: <http://uscode.house.gov/>

U.S. DEPARTMENT OF DEFENSE (DOD)
Order DOD Documents from:
Room 3A750-The Pentagon
1400 Defense Pentagon
Washington, DC 20301-1400
Ph: 703-571-3343
Fax: 215-697-1462
E-mail: customerservice@ntis.gov
Internet: <https://www.ntis.gov/>
Obtain Military Specifications, Standards and Related Publications
from:
Acquisition Streamlining and Standardization Information System
(ASSIST)
Department of Defense Single Stock Point (DODSSP)
Document Automation and Production Service (DAPS)
Building 4/D
700 Robbins Avenue
Philadelphia, PA 19111-5094
Ph: 215-697-6396 - for account/password issues
Internet: <https://assist.dla.mil/online/start/>; account
registration required
Obtain Unified Facilities Criteria (UFC) from:
Whole Building Design Guide (WBDG)
National Institute of Building Sciences (NIBS)
1090 Vermont Avenue NW, Suite 700
Washington, DC 20005
Ph: 202-289-7800
Fax: 202-289-1092
Internet:
<https://www.wbdg.org/ffc/dod/unified-facilities-criteria-ufc>

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)
1200 Pennsylvania Avenue, N.W.
Washington, DC 20004
Ph: 202-564-4700
Internet: <https://www.epa.gov>
--- Some EPA documents are available only from:

National Technical Information Service (NTIS)
5301 Shawnee Road
Alexandria, VA 22312
Ph: 703-605-6060 or 1-800-363-2068
Fax: 703-605-6880
TDD: 703-487-4639
E-mail: info@ntis.gov
Internet: <https://www.ntis.gov/>

U.S. FEDERAL AVIATION ADMINISTRATION (FAA)
Order for sale documents from:
Superintendent of Documents
U.S. Government Publishing Office (GPO)
732 N. Capitol Street, NW
Washington, DC 20401
Ph: 202-512-1800 or 866-512-1800
Bookstore: 202-512-0132
Internet: <https://www.gpo.gov/>
Order free documents from:
U.S. Department of Transportation
Federal Aviation Administration
800 Independence Avenue, SW
Washington, DC 20591
Ph: 866-835-5322
Internet: <https://www.faa.gov/>

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)
1200 New Jersey Ave., SE
Washington, DC 20590
Ph: 202-366-4000
E-mail: ExecSecretariat.FHWA@dot.gov
Internet: <https://www.fhwa.dot.gov/>
Order from:
Superintendent of Documents
U.S. Government Publishing Office (GPO)
732 N. Capitol Street, NW
Washington, DC 20401
Ph: 202-512-1800 or 866-512-1800
Bookstore: 202-512-0132
Internet: <https://www.gpo.gov/>

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)
8601 Adelphi Road
College Park, MD 20740-6001
Ph: 866-272-6272
Internet: <https://www.archives.gov/>
Order documents from:
Superintendent of Documents
U.S. Government Publishing Office (GPO)
732 N. Capitol Street, NW
Washington, DC 20401
Ph: 202-512-1800 or 866-512-1800
Bookstore: 202-512-0132
Internet: <https://www.gpo.gov/>

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

-- End of Section --

SECTION 01 45 00.05 20

DESIGN AND CONSTRUCTION QUALITY CONTROL

06/15, CHG 6: 11/20

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 (2012) Method of Testing General
Ventilation Air-Cleaning Devices for
Removal Efficiency by Particle Size

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

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 (2014) Safety and Health Requirements
Manual

1.2 SUBMITTALS

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

SD-01 Preconstruction Submittals

Design Quality Control (DQC) Plan; G

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

Construction Quality Control (CQC) Plan; G

Submit a Construction QC Plan prior to start of construction.

Indoor Air Quality (IAQ) Management Plan; G

SD-05 Design Data

Design Quality Control Documentation; G

SD-07 Certificates

Preliminary Inspections and Final Acceptance Testing; G

Final Life Safety/Fire Protection Certification; G

1.3 QC PROGRAM REQUIREMENTS

Establish and maintain a QC program that is administered by a Design and Construction Quality Control organization, using Quality Control (Design and Construction) Plans, meetings, a Coordination and Mutual Understanding Meeting, three phases of control, submittal review and approval, testing, completion inspections, and QC certifications, independent Special Inspections in accordance with Section 01 45 35 SPECIAL INSPECTIONS, and documentation necessary to provide design, materials, equipment, workmanship, fabrication, construction and operations which comply with the requirements of this Contract. The QC program must cover on-site and off-site work. No construction work or testing may be performed unless the QC Manager is on the work site.

1.3.1 QC Plan Meeting

Prior to submission of the QC Plan, the QC Manager 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 Features of Work (DFOWs).

1.3.2 Mutual Understanding Meeting

The purpose of this meeting is to develop a mutual understanding of the QC Plans, including documentation, administration, requirements and procedures, coordination of activities to be performed, and the coordination of the contractor's management, production and QC personnel. At the meeting, the contractor will explain in detail how the three phases of quality control will be implemented for each DFOW.

1.3.3 Design and Construction Quality Control Plans

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

- a. The QC organization for this contract, including member resumes.
- b. A letter from an officer of the company designating the QC Manager, Alternate QC Manager, DQC Manager, and their authority.

- c. QC Manager and DQC Manager qualifications in resume format.
- d. Names of the individuals, including their respective firm names, who will be serving as the DOR in their respective design discipline.
- e. List of DFOW including list of design submittal packaging. DFOW is a task that is separate and distinct from other tasks and has control requirements and work crews unique to the task.
- f. For the CQC Plan, a plan to implement the "Three Phases of Control" for each DFOW.
- g. For the CQC Plan, a testing Plan, log and list of personnel and accredited laboratories that will perform tests. Construction materials testing laboratories must be accredited by a laboratory accreditation authority and will be required to submit a copy of the Certificate of Accreditation and Scope of Accreditation with the testing plan.
- h. Submittal Register including design submittals, listing personnel who will review submittals and noting submittals for Contracting Officer review.
- i. Procedures for submitting and reviewing design changes/ variations prior to submission to the Contracting Officer.
- j. As part of the Contractor's DQC plan, a statement of Life Safety and Fire Protection Features Inspections and Testing must be prepared by the Fire Protection Designer of Record (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 fire proofing 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.
- k. For the DQC plan, 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, comment resolution, etc.

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.

- l. For the DQC Plan, procedures for insuring 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.
- m. For the DQC Plan, provide Quality Control Documentation procedures such as QC review sets and QC comments to demonstrate that cross checking of all engineering discipline'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.
- n. For the DQC Plan, a list of design subcontractors and the scope of the work which each firm will accomplish.

1.3.4 Special Inspections

Perform all required Special Inspections and structural observations per Section 01 45 35 SPECIAL INSPECTIONS, the Statement of Special Inspections and the Schedule of Special Inspections.

1.4 QC ORGANIZATION

Provide a QC Manager at the work site to implement and manage the QC program, and to serve as the Site Safety and Health Officer (SSHO) as detailed in Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS. The QC Manager must manage the QC organization and must report to an officer of the firm and must 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 must be held responsible for the quality of work on the job.

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 two weeks at one time, and not more than 30 workdays during a calendar year. Only one Alternate QC Manager will be allowed per Task Order.

1.4.1 QC and Alternate QC Manager

QC and Alternate QC Manager qualifications:

- a. Complete the course entitled "Construction Quality Management (CQM) for Contractors" and maintain a current certificate. The QC Manager that does not have a current certification must obtain the CQM for Contractors course certification within 90 days of award. This course is periodically offered by the Naval Facilities Engineering Command and the Army Corps of Engineers. Contact the Contracting Officer for class schedule information.
- b. Familiar with requirements of USACE EM 385-1-1, and experience in the areas of hazard identification, and safety compliance.
- c. Five years of combined experience as a Superintendent, QC Manager, Project Manager, Construction Manager or Project Engineer on similar size and type construction contracts which included the major trades that are part of this contract, and at least two years' experience as a QC Manager.

QC and Alternate QC Manager responsibilities:

- a. Participate in the Post Award Kick-off, Partnering, Preconstruction, Design Development, and Coordination and Mutual Understanding Meetings.
- b. Implement the "Three Phase of Control" plan for each DFOW and notify the Contracting Officer at least 3 business days in advance of each Preparatory and Initial Phase meeting. Submit respective checklists to the Contracting Officer the next business day.
- c. Ensure that no construction begins before the DOR has finalized the design for that segment of work, and construction submittals are approved as required.
- d. Inspect all work and rework, using International Conference of Building Officials certified QC specialists as applicable, to ensure its compliance with contract requirements. Maintain a rework log.
- e. Immediately stop any segment of work, which does not comply with the contract requirements and direct the removal and replacement of any defective work.
- f. Remove any individual from the site who fails to perform their work in a skillful, safe and workmanlike manner or whose work does not comply with the contract plans and specifications.
- g. Prepare daily QC Reports.
- h. Ensure that Contractor Production Reports are prepared daily.
- i. Hold bi-weekly QC meetings with the DQC Manager, DOR (or representative), Superintendent and the Contracting Officer; participation must be suitable for the phase of work. Distribute minutes of these meetings.
- j. Ensure that design and construction submittals are reviewed and approved, as required by the contract, prior to allowing material on site and work to proceed with these items. Maintain a submittal register.
- k. Update As-built drawings daily, maintaining up-to-date set on site.

- l. Maintain a testing plan and log. Ensure that all testing is performed in accordance with the contract. Review all test reports and notify the Contracting Officer of all deficiencies, along with a proposal for corrective action.
- m. Maintain rework log on site, noting dates deficiency identified, and date corrected.
- n. Certify and sign statement on each invoice that all work to be paid under the invoice has been completed in accordance with contract requirements.
- o. Perform Punch-out and participate in Pre-final and Final acceptance Inspections. Submit list of deficiencies to the Contracting Officer for each inspection. Correct all deficiencies prior to the Final inspection. Notify Contracting Officer prior to final inspection to establish a schedule date acceptable by the Contracting Officer.
- p. Ensure that all required keys, operation and maintenance manuals, warranty certificates, and the As-built drawings are correct and complete, in accordance with the contract, and submitted to the Contracting Officer.
- q. Assure that all applicable tests, and observations required by the contract are performed.
- r. Coordinate all factory and on-site testing, Testing Laboratory personnel, QC Specialists, and any other inspection and testing personnel required by this Contract.
- s. Notify the Contracting Officer of any proposed changes to the QC plan.
- t. Retain a copy of approved submittals at project site, including Contractor's copy of approved samples.
- u. Update the Performance Assessment Plan as described in Section 01 31 19.05 20 CONCEPT DESIGN WORKSHOP (CDW) and discuss monthly at a QC meeting.
- v. Coordinate training of Government maintenance personnel with the preparer of the Operation & Maintenance (O&M) documentation to assure training materials and training classes are accurate and provide instruction and documentation on critical elements of the products, materials, and systems in the constructed facility. Verify that the Government's operating personnel were trained.
- w. 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. The QC manager is responsible for coordinating the Special Inspection activities, see paragraph QUALITY CONTROL MANAGER, in Section 01 45 35 SPECIAL INSPECTIONS.
- x. Supervise all Special Inspectors required by the contract documents and the IBC.
- y. Verify the qualifications of all of the Special Inspectors.
- z. Verify the qualifications of fabricators.

- aa. Maintain a 3-ring binder for the Special Inspector's daily and biweekly reports. This file must be located in a conspicuous place in the project trailer/office to allow review by the Contracting Officer and the DOR.

1.4.2 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.

DQC Manager 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."

DQC Manager responsibilities:

- a. Be responsible for the design integrity, professional design standards, and all design services required.
- b. Be a member of the Designer of Record's (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 01 78 23 OPERATION AND MAINTENANCE DATA.

1.4.3 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.

1.4.4 QC Specialists

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

1.4.4.1 Fire Protection QC Specialist

The Fire Protection QC Specialist (FPQC) must be a U.S. registered Professional Engineer and must be an integral part of the Prime Contractor's Quality Control Organization. This FPQC must have no business relationships (owner, partner, operating officer, distributor, salesman, or technical representative) with any fire protection equipment device manufacturers, suppliers or installers for any such equipment provided as part of this project. The Fire Protection Designer of Record may serve as the lead Fire Protection QC Specialist, provided the following qualifications are met.

- a. **Qualifications/Experience:** The FPQC must have obtained their professional registration by successfully completing the Fire Protection Engineering discipline examination. This FPQC must have a minimum of 5 years fulltime 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 is responsible for assuring the proper construction and installation of life safety and fire protection features across all disciplines and trades. The FPQC must be responsible for assuring that life safety and fire protection features are provided in accordance with the design documents, approved construction submittals, and manufacturer's requirements. Examples include, but are not limited to, water distribution systems including fire pumps and fire hydrants, fire resistive assemblies such as spray-applied fire proofing of structural components and fire rated walls/partitions, fire alarm and detection systems, fire suppression

and standpipe systems, emergency and exit lighting fixtures, etc.

- c. Construction Surveillance: The FPQC is responsible for reviewing and implementing the QC Plan developed by the Fire Protection DOR. The FPQC 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 systems to inspect the integrity of passive fire protection features and fire suppression system piping, and required performance verification testing of all life safety and fire protection systems identified below and in Part 4.
 - (1) Visual Inspection: Installation of underground service mains and service laterals, thrust blocks, tie rod, and connection to aboveground piping. Visually inspect fire sprinkler and fire alarm system, building construction features including fire rated assemblies, partitions, rated doors, penetrations, etc. Visually inspect life safety features including emergency lighting, egress lighting, locking arrangements, etc.
 - (2) Preliminary Inspections and Final Acceptance Testing: FPQC must personally witness all preliminary inspections of fire alarm/detection and suppression systems, flushing of underground piping before connection to aboveground piping, hydrostatic testing, and life safety systems. Once preliminary inspections have been successfully completed, the FPQC 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.
- d. QC Documentation and Certifications: The following documentation and certification must be prepared by the FPQC. Additional copies must be submitted to the NAVFAC Fire Protection Engineer and the Installation Fire Chief.
 - (1) Field visit reports. Submit reports documenting all field visits and summarizing all findings.
 - (2) Inspection and Test reports and certificates. Submit in accordance with the applicable codes, standards, and this RFP.
 - (3) Final Life Safety/Fire Protection Certification. Provide FPQC certification that all life safety and fire protection systems have been inspected and in the FPQC's professional judgment, have been installed in accordance with the contract documents, approved submittals, and manufacturer's requirements. This certification must summarize all life safety and fire protection features, and must bear the professional seal of the fire protection engineer.

1.4.4.2 Mechanical QC Specialist

Qualification/Experience in Area of Responsibility	Area of Responsibility	Frequency
Mechanical Inspector, International Conference of Building Officials (ICBO) Certified / 5 years minimum	Installation and Testing of Boilers	Minimum 3 times a week during installation and full-time during testing
Registered Mechanical Engineer (PE)/ QC Specialist	Testing of Installed mechanical systems	Full time during testing

1.4.4.3 Building Envelope QC Specialists

Qualification / Experience in Area of Responsibility	Area of Responsibility	Frequency
Roofing Manufacturer's Technical Representative / 5 years minimum with roofing system used.	Installation and testing of roofing.	Once a week during installation, two times a week during flashing installation and full time during roof testing.

1.4.4.4 Structural QC Specialists

Qualification / Experience in Area of Responsibility	Area of Responsibility	Frequency
Registered Structural Engineer (PE)/ QC Specialist	As required by UFC 1-200-01; Section 2-17, Structural Inspections and Testing	As required by UFC 1-200-01; Section 2-17, Structural Inspections and Testing

1.4.4.5 Soils and Piling QC Specialists

Qualification / Experience in Area of Responsibility	Area of Responsibility	Frequency
Registered Structural Engineer (PE)/ QC Specialist	Soils Testing, Pile Installaton and Testing	Once a week during installation, and full time during testing.

1.4.4.6 Electrical and Telecommunications QC Specialists

Qualification / Experience in Area of Responsibility	Area of Responsibility	Frequency
Electrical Inspector, Crew supervision for 10 years. Master Electrician licensed in Virginia	Electrical Systems; All Division 26 Sections and Division 33 Sections.	Full time during installation and testing of all systems.
Telecommunications Systems Installation Specialist. 10 years minimum experience in telecommunications systems installation	Telecommunication Systems; All Division 27, 28, and 33 (Outside Plant (OSP)) Sections.	Full time during installation and testing of all systems.

1.4.4.7 Special Inspector

The Special Inspector (SI) must be an independent third party hired directly by the Prime Contractor. The SI must have not be a company employee of the Contractor or any Sub-Contractor performing the work to be inspected. The qualifications of the SI are defined in Section 01 45 35 SPECIAL INSPECTIONS.

1.5 TESTING

1.5.1 Accreditation Requirements

Construction materials testing laboratories must be accredited by a laboratory accreditation authority and will be required to submit a copy of the Certificate of Accreditation and Scope of Accreditation. The laboratory's scope of accreditation must include the appropriate ASTM standards (E 329, C 1077, D 3666, D 3740, A 880, E 543) 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.

1.5.2 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/about-nvlap>, the American Association of State Highway and Transportation Officials (AASHTO) program at <http://aashtoresource.org/>, International Accreditation Services (IAS) at <https://www.iasonline.org>, U.S. Army Corps of Engineers Materials Testing Center (MTC) at <https://mtc.erdc.dren.mil/>, the American Association for Laboratory Accreditation (A2LA) program at <https://www.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).

1.5.3 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.

1.5.4 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 INFORMATION FOR THE CONTRACTING OFFICER.

1.5.5 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 Contractor Quality Control Report of each month. Provide a copy of the signed test reports and certifications to the preparer of the Operation & Maintenance (O&M) documentation.

1.6 THREE PHASES OF CONTROL

The Three Phases of Control must adequately cover both on-site and off-site work and must include the following for each DFOW.

1.6.1 Preparatory Phase

Notify the Contracting Officer at least two work days in advance of each preparatory phase meeting. The meeting must be conducted by the QC Manager and attended by the Project Superintendent, QC Specialists, and the foreman responsible for the DFOW. The Special Inspector must also attend if required by Special Inspections, as outlined in the Statement of Special Inspections and Schedule of Special Inspections. When the DFOW will be accomplished by a subcontractor, that subcontractor's foreman must attend the preparatory phase meeting. Document the results of the preparatory phase actions in the daily Contractor Quality Control Report and in the Preparatory Phase Checklist. Perform the following prior to beginning work on each DFOW:

- a. Review each paragraph of the applicable specification sections;
- b. Review the Contract drawings;
- c. Verify that appropriate shop drawings and submittals for materials and equipment have been submitted and approved. Verify receipt of approved factory test results, when required;
- d. Review the testing plan and ensure that provisions have been made to provide the required QC testing;
- e. Review Special Inspections required by Section 01 45 35 SPECIAL INSPECTIONS, the Statement of Special Inspections and the Schedule of Special Inspections.
- f. Examine the work area to ensure that the required preliminary work has been completed;
- g. 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;
- h. Discuss the specific controls used in construction methods, construction tolerances, workmanship standards, and the approach that will be used to provide quality construction by planning ahead and identifying potential problems for each DFOW; and
- i. 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.

1.6.2 Initial Phase

Notify the Contracting Officer at least two work days in advance of each initial phase. When construction crews are ready to start work on a DFOW, conduct the initial phase with the Project Superintendent, QC Specialists, and the foreman responsible for that DFOW. The Special Inspector must also attend if required by Special Inspections, as outlined in the Statement of Special Inspections and Schedule of Special Inspections. 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 Initial Phase Checklist. Repeat the initial phase for each new crew to work on-site, or when acceptable levels of specified quality are not being met. Perform the following for each DFOW:

- a. Establish the quality of workmanship required;
- b. Resolve conflicts;
- c. Ensure that testing is performed by the approved laboratory, and
- d. Check work procedures for compliance with the APP and the appropriate AHA to ensure that applicable safety requirements are met.
- e. Ensure manufacturer's representative has performed necessary inspections, if required.
- f. Coordinate scheduled work with Special Inspections required by the Section 01 45 35 SPECIAL INSPECTIONS, the Statement of Special Inspections and the Schedule of Special Inspections.

1.6.3 Follow-Up Phase

Perform the following for on-going work daily, or more frequently as necessary, until the completion of each DFOV and document in the daily CQC Report:

- a. Ensure the work is in compliance with Contract requirements;
- b. Maintain the quality of workmanship required;
- c. Ensure that testing is performed by the approved laboratory; and
- d. Ensure that rework items are being corrected.
- e. Coordinate scheduled work with Special Inspections required by the Section 01 45 35 SPECIAL INSPECTIONS, the Statement of Special Inspections and the Schedule of Special Inspections.

1.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases must be conducted on the same DFOV 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 DFOV is resumed after substantial period of inactivity, or if other problems develop.

1.6.5 Notification of Three Phases of Control for Off-Site Work

Notify the Contracting Officer at least two weeks prior to the start of the preparatory and initial phases.

1.7 COMPLETION INSPECTIONS

The Contractor must perform the necessary punch-out, pre-final, and final inspections, compile punch lists, and correct deficiencies.

1.7.1 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 "Rework Items List", which were not corrected prior to the Punch-Out Inspection. 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. Once this is accomplished, notify the Contracting Officer that the facility is ready for the Government "Pre-Final Inspection".

1.7.2 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 prior to notifying the Government that a "Final" inspection with the Client can be scheduled. Any items noted on the "Pre-Final" inspection must be corrected in a timely manner and be accomplished before the contract completion date for the work or any particular increment thereof, if the project is divided into increments by separate completion dates.

1.7.3 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 FEAD/ROICC personnel, and personnel representing the Client. Failure of the Contractor to have all contract work acceptably complete for this inspection will because 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."

1.8 DOCUMENTATION

Maintain current and complete records of on-site and off-site QC program operations and activities.

1.9 CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT PLAN

Submit an IAQ Management Plan within 15 days after notice to proceed and not less than 10 days before the preconstruction meeting. 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.

1.9.1 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.

1.9.1.1 Control Measures

Meet or exceed the requirements of ANSI/SMACNA 008, Chapter 3, 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.

1.9.1.2 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.

1.9.2 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 two-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.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

-- End of Section --

[illegible]

CONTRACTOR QUALITY CONTROL REPORT (ATTACH ADDITIONAL SHEETS IF NECESSARY)				DATE Enter (DD/MMM/YY)	
				REPORT NO Enter Rpt # Here	
PHASE	CONTRACT NO	Enter Cnt# Here	CONTRACT TITLE	Enter Title and Location of Construction Contract Here	
PREPARATORY	WAS PREPARATORY PHASE WORK PREFORMED TODAY? YES <input type="checkbox"/> NO <input type="checkbox"/>				
	IF YES, FILL OUT AND ATTACH SUPPLEMENTAL PREPARATORY PHASE CHECKLIST.				
	Schedule Activity No.	Definable Feature of Work			Index #
INITIAL	WAS INITIAL PHASE WORK PREFORMED TODAY? YES <input type="checkbox"/> NO <input type="checkbox"/>				
	IF YES, FILL OUT AND ATTACH SUPPLEMENTAL INITIAL PHASE CHECKLIST.				
	Schedule Activity No.	Definable Feature of Work			Index #
FOLLOW-UP	WORK COMPLIES WITH CONTRACT AS APPROVED DURING INITIAL PHASE? YES <input type="checkbox"/> NO <input type="checkbox"/>				
	WORK COMPLIES WITH SAFETY REQUIREMENTS? YES <input type="checkbox"/> NO <input type="checkbox"/>				
	Schedule Activity No.	Description of Work, Testing Performed & By Whom, Definable Feature of Work, Specification Section, Location and List of Personnel Present			
REWORK ITEMS IDENTIFIED TODAY (NOT CORRECTED BY CLOSE OF BUSINESS)		REWORK ITEMS CORRECTED TODAY (FROM REWORK ITEMS LIST)			
Schedule Activity No.	Description	Schedule Activity No.	Description		
REMARKS (Also Explain Any Follow-Up Phase Checklist Item From Above That Was Answered "NO"), Manuf. Rep On-Site, etc.					
Schedule Activity No.	Description				
<p>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.</p> <div style="display: flex; justify-content: space-between;"> AUTHORIZED QC MANAGER AT SITE DATE </div>					
GOVERNMENT QUALITY ASSURANCE REPORT				DATE	
QUALITY ASSURANCE REPRESENTATIVE'S REMARKS AND/OR EXCEPTIONS TO THE REPORT					
Schedule Activity No.	Description				
<div style="display: flex; justify-content: space-between;"> GOVERNMENT QUALITY ASSURANCE MANAGER DATE </div>					

GOVERNMENT QUALITY ASSURANCE (QA) REPORT (ATTACH ADDITIONAL SHEETS IF NECESSARY)					DATE Enter Date (DD/MMM/YY)	
CONTRACT NO Enter Cnt# Here		TITLE AND LOCATION Enter Title and Location of Construction Contract Here			REPORT NO Enter Report # Here	
Status	WORKING?	YES	NO	IF NO, WHY NOT: _____ _____		
		<input type="checkbox"/>	<input type="checkbox"/>			
WEATHER CONDITIONS: _____						
Check Points		YES	NO	REMARKS:		
	SUPERINTENDENT ON SITE	<input type="checkbox"/>	<input type="checkbox"/>			
	QC MANAGER ON SITE	<input type="checkbox"/>	<input type="checkbox"/>			
	QC REPORTS CURRENT	<input type="checkbox"/>	<input type="checkbox"/>			
	AS-BUILTS CURRENT	<input type="checkbox"/>	<input type="checkbox"/>			
	SUBMITTALS APPROVED FOR FOR ONGOING WORK	<input type="checkbox"/>	<input type="checkbox"/>			
	DEFICIENCY LIST REVIEWED	<input type="checkbox"/>	<input type="checkbox"/>			
WORK OBSERVED/DEFICIENCIES NOTED/SAFETY ISSUES DISCUSSED/QA TESTS AND RESULTS:						
Schedule Activity No	DESCRIBE OBSERVATIONS					
MEETING/CONFERENCE NOTES (INCLUDING PARTICIPANTS):						
Schedule Activity No.	NOTES					
INSTRUCTIONS GIVEN OR RECEIVED/CONTROVERSIES PENDING:						
Schedule Activity No.	INSTRUCTIONS/CONTROVERSIES					
_____ QA REPRESENTATIVE						
_____ DATE						
_____ SUPV INITIALS						
_____ DATE						

INITIAL PHASE CHECKLIST		SPEC SECTION Enter Spec Section # Here	DATE Enter Date (DD/MMM/YY)
CONTRACT NO Enter Cnt# Here	DEFINABLE FEATURE OF WORK Enter DFOW Here	SCHEDULE ACT NO. Enter Sched Act ID Here	INDEX # Enter Index# Here
PERSONNEL PRESENT	GOVERNMENT REP NOTIFIED ____ HOURS IN ADVANCE: YES <input type="checkbox"/> NO <input type="checkbox"/>		
	NAME	POSITION	COMPANY/GOVERNMENT
PROCEDURE COMPLIANCE	IDENTIFY FULL COMPLIANCE WITH PROCEDURES IDENTIFIED AT PREPARATORY. COORDINATE PLANS, SPECIFICATIONS, AND SUBMITTALS.		
	COMMENTS: _____		
PRELIMINARY WORK	ENSURE PRELIMINARY WORK IS COMPLETE AND CORRECT. IF NOT, WHAT ACTION IS TAKEN?		
WORKMANSHIP	ESTABLISH LEVEL OF WORKMANSHIP.		
	WHERE IS WORK LOCATED? _____		
	IS SAMPLE PANEL REQUIRED? YES <input type="checkbox"/> NO <input type="checkbox"/>		
	WILL THE INITIAL WORK BE CONSIDERED AS A SAMPLE? YES <input type="checkbox"/> NO <input type="checkbox"/>		
(IF YES, MAINTAIN IN PRESENT CONDITION AS LONG AS POSSIBLE AND DESCRIBE LOCATION OF SAMPLE) _____			
RESOLUTION	RESOLVE ANY DIFFERENCES.		
	COMMENTS: _____		
CHECK SAFETY	REVIEW JOB CONDITIONS USING EM 385-1-1 AND JOB HAZARD ANALYSIS		
	COMMENTS: _____		
OTHER	OTHER ITEMS OR REMARKS		

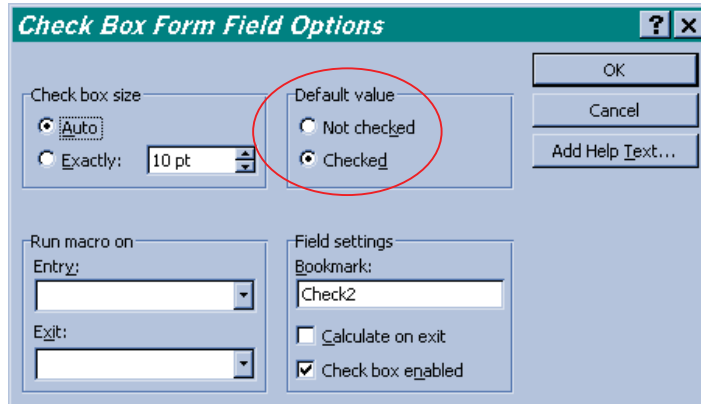
QC MANAGER

DATE

Instructions for Using Report Forms in MS-Word

In the Report Header, fields that have instructional text such as “Enter Title and Location of Construction Contract Here” prompt the user to enter the information in a specific location, governed by the field. Single mouse click anywhere in the field and the field will darken. Entry of text/data at this point will delete the instructional text in the field and will be replaced with entered text/data.

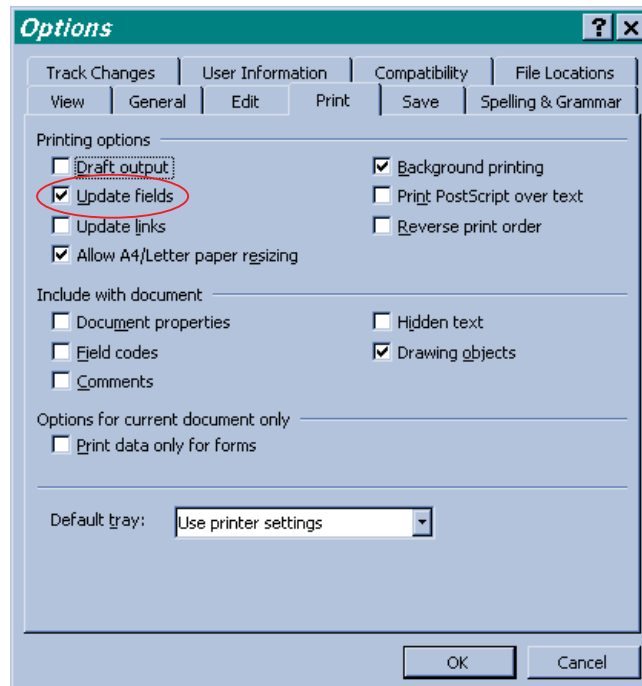
All check boxes are all defaulted as unchecked (i.e.; ☐). To check the box (i.e.; ☒) , double click the box and the “Check Box Form Field Options” box will appear. In the “Default value” section of the box, click in the Radio Button for “Checked”, then click on the “OK” button and the box will be checked.



The “Hour” fields were intentionally not programmed to total. If the Contractor deleted the formula in a field within the range that was to be totaled, the total would be wrong.

With the ability to [unlimitedly] expand the Contractor Production Report and Contractor Quality Control Representative Report, their Continuation Sheets are obsolete.

In the footer of each form are data fields for the Sheet number and the total number of sheets in the report (Sheet 1 of 2). The first number will generate itself when pages of the report are added. But MS-Word will not automatically update the second number. To update the NumPages field, click the field or the field results and then press F9. You can also click **Options** in the **Tools** menu, click the **Print** tab, and then select the **Update fields** check box.



PREPARATORY PHASE CHECKLIST		SPEC SECTION	DATE
(CONTINUED ON SECOND PAGE)		Enter Spec Section # Here	Enter Date (DD/MMM/YY)
CONTRACT NO	DEFINABLE FEATURE OF WORK	SCHEDULE ACT NO.	INDEX #
Enter Cnt# Here	Enter DFOW Here	Enter Sched Act ID Here	Enter Index# Here
PERSONNEL PRESENT	GOVERNMENT REP NOTIFIED _____ HOURS IN ADVANCE: YES <input type="checkbox"/> NO <input type="checkbox"/>		
	NAME	POSITION	COMPANY/GOVERNMENT
SUBMITTALS	REVIEW SUBMITTALS AND/OR SUBMITTAL REGISTER. HAVE ALL SUBMITTALS BEEN APPROVED? YES <input type="checkbox"/> NO <input type="checkbox"/>		
	IF NO, WHAT ITEMS HAVE NOT BEEN SUBMITTED? _____		
	ARE ALL MATERIALS ON HAND? YES <input type="checkbox"/> NO <input type="checkbox"/>		
	IF NO, WHAT ITEMS ARE MISSING? _____		
MATERIAL STORAGE	ARE MATERIALS STORED PROPERLY? YES <input type="checkbox"/> NO <input type="checkbox"/>		
	IF NO, WHAT ACTION IS TAKEN? _____		
SPECIFICATIONS	REVIEW EACH PARAGRAPH OF SPECIFICATIONS. _____		
	DISCUSS PROCEDURE FOR ACCOMPLISHING THE WORK. _____		
PRELIMINARY WORK & PERMITS	ENSURE PRELIMINARY WORK IS CORRECT AND PERMITS ARE ON FILE.		
	IF NOT, WHAT ACTION IS TAKEN? _____		

TESTING	IDENTIFY TEST TO BE PERFORMED, FREQUENCY, AND BY WHOM. _____
	WHEN REQUIRED? _____
	WHERE REQUIRED? _____
	REVIEW TESTING PLAN. _____
	HAS TEST FACILITIES BEEN APPROVED? _____
SAFETY	ACTIVITY HAZARD ANALYSIS APPROVED? YES <input type="checkbox"/> NO <input type="checkbox"/>
	REVIEW APPLICABLE PORTION OF EM 385-1-1. _____
MEETING COMMENTS	NAVY/ROICC COMMENTS DURING MEETING.
OTHER ITEMS OR REMARKS	OTHER ITEMS OR REMARKS:
<div>QC MANAGER _____</div> <div>DATE _____</div>	

RESPONSIBILITIES/AUTHORITY OF THE QC MANAGER

1. Appointing letter to the QC manager shall detail his/her authority and responsibility to act for the contractor and outline his/her duties, responsibilities and authority. He/she shall have no job-related responsibilities other than QC unless specifically permitted in the specification.
2. He/she shall be on the site at all times during progress of the work, with complete authority to take any action necessary to ensure conformance with the contract requirements. In the event of his/her absence, approved backup shall be on the site.
3. Authority to immediately stop any segment of work which does not comply with the contract plans and specifications and direct the removal and replacement of any defective work.
4. Conduct daily inspection of work performed for compliance with plans and specifications.
5. Certify daily that all materials and equipment delivered/installed in the work comply with contract plans and specifications. Certify daily that all work performed on the construction site and off the construction site conforms to plans and specifications. Report any deficiencies and remedial action planned and taken.
6. Supervise and coordinate the inspection and tests made by the members of the Quality Control Organization, including subcontractors.
7. Assure QC staff is adequate to meet its responsibilities.
8. Maintain a copy of the ROICC approved QC Plan on file at the jobsite complete with up-to-date approved revisions/filled-in log of submittals. Maintain at the jobsite an up-to-date QC Submittal Register (provided in the specification) showing the status of all submittals required by the contract.
9. Maintain at the jobsite a testing plan showing status of all tests required by the contracts. Ensure that all tests required are performed and report the results of same. Indicate whether test results show the item tested conforms to contract requirements or not.
10. Authority to remove any individual from the site who fails to perform his/her work in a skillful and workmanlike manner or his/her work does not comply with the contract plans and specifications.
11. QC manager does not have authority to deviate from plans and specifications without prior approval, in writing, from the ROICC.
12. Ensure that the contractor's Quality Control Organization is adequately staffed with qualified personnel to perform all the detailed inspections and testing specified in the plans and specifications.
13. Maintain at the jobsite the up-to-date QC Rework Items List.

REWORK ITEMS LIST

Contract No. and Title: Enter Contract # and Title Here

Contractor: Enter Contractor's Company Name Here

[illegible]

TESTING PLAN AND LOG

[illegible]

SECTION 01 45 35

SPECIAL INSPECTIONS

11/20

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.

INTERNATIONAL CODE COUNCIL (ICC)

ICC IBC (2021) International Building Code

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 3-301-01 (2019) Structural Engineering

1.2 GENERAL REQUIREMENTS

Perform Special Inspections in accordance with the Statement of Special Inspections, Schedule of Special Inspections and Chapter 17 of ICC IBC. 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.

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 Periodic Special Inspections

Periodic Special Inspections is Special Inspections by the special inspector who is intermittently present where the work to be inspected has been or is being performed.

1.3.3 Perform

Perform these Special Inspections tasks for each welded joint or member.

1.3.4 Observe

Observe these Special Inspections items on a periodic daily basis. Operations need not be delayed pending these inspections.

1.3.5 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.

1.3.6 Associate Special Inspector (ASI)

A qualified person who assists the SI in performing Special Inspections but must perform inspection under the direct supervision of the SI and cannot perform inspections without the SI on site.

1.3.7 Third Party

A Special inspector must not be an employee of the Contractor or of any Sub-Contractor performing the work to be inspected.

1.3.8 Special Inspector of Record (SIOR)

A licensed 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.

1.3.9 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).

1.3.10 Contractor's Quality Control (QC) Manager

An individual retained by the Prime Contractor and qualified in accordance with the Section 01 45 00.05 20 DESIGN AND CONSTRUCTION QUALITY CONTROL having the overall responsibility for the Contractor's QC organization.

1.3.11 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 code documents.

1.3.12 Statement of Special Inspections (SSI)

A document developed by the SER identifying the material, systems, components and work required to have Special Inspections. This statement is included at the end of this specification.

1.3.13 Schedule of Special Inspections (SSI)

A schedule 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. This schedule is included at the end of this specification.

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" classification. Submittals not having a "G" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 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 Inspections Daily Reports

Special Inspections Biweekly Reports

SD-07 Certificates

AISC Certified Steel Fabricator

Steel Truss Plant Quality Assurance Program

Steel Joist Institute Membership

Precast Concrete Institute (PCI) Certified Plant

Certificate of Compliance

Special Inspector of Record Qualifications; G

Special Inspector Qualifications; G

Qualification Records for NDT technicians

SD-11 Closeout Submittals

Interim Report of Special Inspections for Each DFOW; G

Comprehensive Final Report of Special Inspections; G

1.5 SPECIAL INSPECTOR QUALIFICATIONS

Submit qualifications for each special inspector and the special inspector of record.

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 three 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. ICC Residential Building Inspector with one year of experience, or
- d. Registered Professional Engineer with three 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 three 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 Pre-stressed 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 three 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 Masonry Construction

1.5.7.1 Special Inspector

- a. ICC Structural Masonry Special Inspector Certificate with one year of related experience, or
- b. Registered Professional Engineer with three years of related experience

1.5.7.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

1.5.8 Verification of Site Soil Condition, Fill Placement and Load-Bearing Requirements

1.5.8.1 Special Inspector

- a. ICC Soils Special Inspector Certificate with one year of related experience, or
- b. NICET Soils Technician Level II Certificate in Construction Material Testing, or
- c. Geologist-In-Training with three years of related experience, or
- d. Registered Professional Engineer with three years of related experience

1.5.8.2 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

1.5.9 Deep Foundations

1.5.9.1 Special Inspector

- a. NICET Soils Technician Level II Certificate in Construction Material Testing, or
- b. Geologist-In-Training with three years of related experience, or
- c. Registered Professional Engineer with three years of related experience

1.5.9.2 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

1.5.10 Sprayed Fire Resistant Material

1.5.10.1 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

1.5.10.2 Associate Special Inspector

Engineer-In-Training with one year of related experience

1.5.11 Mastic and Intumescent Fire Resistant Coatings

1.5.11.1 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

1.5.11.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

1.5.12 Fire-Resistant Penetrations and Joints

1.5.12.1 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. Registered Professional Engineer with related experience

1.5.12.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

1.5.13 Smoke Control

1.5.13.1 Special Inspector

- a. AABC Technician Certification with one year of related experience, or
- b. Registered Professional Engineer with related experience

1.5.13.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

1.5.14 Special Inspector of Record (SIOR)

Registered Professional Engineer with five years of related experience.

PART 2 PRODUCTS

2.1 FABRICATOR SPECIAL INSPECTIONS

Special Inspections 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 certification 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.

Steel Joist Institute Membership

Precast Concrete Institute (PCI) Certified Plant, Group C

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 a 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 Inspections 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 qualifications 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 (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, who 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 FABRICATOR SPECIAL INSPECTIONS.
- (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 detail 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 Inspections provisions and the individual duties and responsibilities of each party.
- j. Maintain a 3-ring binder for the Special Inspector's daily and biweekly reports and the Special Inspections Project Manual. This file 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 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 Inspections activity occurs, and must include the following:
 - (1) A brief summary of the work performed during the reporting time frame.
 - (2) Changes 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 bear the seal of the SIOR.

3.1.2 Quality Control Manager

- a. Supervise all Special Inspectors required by the Contract Documents and the IBC.
- b. Verify the qualifications of all of the Special Inspectors.
- c. Verify the qualifications of fabricators.
- d. Maintain a 3-ring binder for the Special Inspector's daily and biweekly reports. This file must be located in a conspicuous place in the project trailer/office to allow review by the Contracting Officer and the SER.
- e. Maintain a rework items list that includes discrepancies noted on the Special Inspectors daily report.

3.1.3 Special Inspectors

- a. Inspect all elements of the project for which the special inspector is qualified to inspect and are identified in the Schedule of Special Inspections.
- b. Attend preparatory phase meetings related to the Definable Feature of Work (DFOW) for which the special inspector is qualified to inspect.
- c. Submit Special Inspections 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 qualifications 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 (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 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 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 DFOV requiring Special Inspections, submit an interim report of Special Inspections that documents the Special Inspections completed for that DFOV. 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, dated and 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, dated and indicate the certification of the special inspector qualifying them to conduct the inspection.
- k. Submit 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. Submit the Statement of Special Inspections and the Schedule of Special Inspections for approval by the Contracting Officer.

The Statement of Special Inspection must include the following information:

- (1) List of Architectural Designated Seismic Systems.
- (2) List of Mechanical Designated Seismic Systems.
- (3) List of the Electrical Designated Seismic Systems.
- (4) Define the periodic walk-down inspections required by UFC 3-301-01.
- (5) List of elements that are part of the progressive collapse resistance system.

Develop Schedule of Special Inspection using the template located on

the Whole Building Design Guide website at: www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/ufgs-01-45-35

- b. Prior to the start of structural observations submit a written statement identifying the frequency and delineation wind/seismic force resisting system requiring structural observations.
- c. 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.
- d. Perform a final walk-down inspection of the designated seismic systems for mechanical and electrical components with the Nonstructural Component Design Review Panel to ensure that the non-structural elements satisfy life safety mounting requirements as defined in the Statement of Special Inspections.
- e. Submit a report of the final walk-down inspection that includes the following:
 - (1) Record/observations of 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.

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 such work.

-- End of Section --

Project: Composite Shop P-1127
 Location: Norfolk, VA
 Project #: 1702359
 Date: 10/12/2021



STATEMENT OF SPECIAL INSPECTIONS

Project Seismic Design Category: B
 Project Risk Category: II
 Project Design Wind Speed (mph): 118
 Number of Stories: 1
 Structure Height Above Grade (ft): 20
 Hazardous Occupancy or attached to such? No Group H Occupancies

Special Inspector of Record (SIOR)

A Special Inspector of Record (SIOR) IS NOT required (per UFGS 01 45 35, Section 1.3.8)

Lateral Force Resisting System (LFRS)

2018 IBC 1704.3.2 and 1704.3.3

Following is a listing of critical main wind/seismic force resisting systems for this structure. Carefully inspect these elements as part of the roles and responsibilities of the Special Inspector (reference the Schedule of Special Inspections for inspection checklists).

Vertical LFRS Elements	Notes
Load bearing CMU walls	See Key Notes
Horizontal LFRS Elements	Notes
Metal Roof Deck & Related Fastening System	See Key Notes

Project #: 1702359
Date: 10/12/2021

Designated Seismic Systems (DSS)

(2018 IBC 1705.13.3) (ASCE 7-16, 13.2.2, C13.2.2) (UFC 3-301-1, 2-5.3)

DESIGNATED SEISMIC SYSTEMS DO NOT APPLY TO THIS PROJECT, due to the Seismic Design Category being less than C.

ELECTRICAL Designated Seismic Systems (DSS) Requiring a Certificate of Compliance
N/A
N/A
N/A
N/A
N/A

If additional space is required, append an additional sheet listing the remaining DSS

MECHANICAL/PLUMBING Designated Seismic Systems (DSS) Requiring a Certificate of Compliance
N/A
N/A
N/A
N/A
N/A
N/A

If additional space is required, append an additional sheet listing the remaining DSS

OTHER Designated Seismic Systems (DSS) Requiring a Certificate of Compliance
N/A
N/A
N/A
N/A
N/A
N/A

Final Walk Down Inspection and Report

(UFC 3 301 01 SECTION 2-5.4)

Final Walk Down Inspection of non-structural Designated Seismic Systems does not apply to this project (no Designated Seismic Systems)

SCHEDULE OF SPECIAL INSPECTIONS

Reference UFGS 01 45 35 for all requirements not noted as part of this schedule.

INSPECTION DEFINITIONS:

- PERFORM:** Perform these tasks for each weld, fastener or bolted connection, and noted verification.
- OBSERVE:** Observe these items randomly during the course of each work day to insure that applicable requirements are being met. Operations need not be delayed pending these inspections at contractor's risk.
- DOCUMENT:** Document, with a report, that the work has been performed in accordance with the contract documents. This is in addition to any other reports required in the Special Inspections guide specification.
- CONTINUOUS:** Constant monitoring of identified tasks by a special inspector over the duration of performance of said tasks.

The Seismic Design Category for this project is: ☐ A, ☒ B, ☐ C, ☐ D, ☐ E, ☐ F (check appropriate box)

STRUCTURAL - STEEL – WELDING SECTION**ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED: ☒**

STEEL INSPECTION <u>PRIOR TO WELDING</u> – VERIFY THE FOLLOWING ARE IN COMPLIANCE 2018 IBC 1705.2.1, AISC 360-16: Table C-N5.4-1		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. Verify that the welding procedures specification (WPS) is available	PERFORM	
2. Verify manufacturer certifications for welding consumables are available	PERFORM	
3. Verify material identification	PERFORM	Type and grade.
4. Welder Identification System	PERFORM	The fabricator or erector, as applicable, shall maintain a system by which a welder who has welded a joint or member can be identified. Stamps, if used, shall be the low-stress type.
5. Fit-up of groove welds (including joint geometry)	OBSERVE	<ul style="list-style-type: none"> ✓ Joint preparation ✓ Dimensions (alignment, root opening, root face, bevel) ✓ Cleanliness (condition of steel surfaces) ✓ Tacking (tack weld quality and location) ✓ Backing type and fit (if applicable)
6. Configuration and finish of access holes	OBSERVE	
7. Fit-up of fillet welds	OBSERVE	<ul style="list-style-type: none"> ✓ Dimensions (alignment, gaps at root) ✓ Cleanliness (condition of steel surfaces) ✓ Tacking (tack weld quality and location)
STEEL INSPECTION <u>DURING WELDING</u> – VERIFY THE FOLLOWING ARE IN COMPLIANCE 2018 IBC 1705.2.1, AISC 360-16: Table C-N5.4-2		
TASK	INSPECTION TYPE	DESCRIPTION
8. Use of qualified welders	PERFORM	Welding by welders, welding operators, and tack welders who are qualified in conformance with requirements.
9. Control and handling of welding consumables	OBSERVE	<ul style="list-style-type: none"> ✓ Packaging ✓ Electrode atmospheric exposure control
10. No welding over cracked tack welds	OBSERVE	
11. Environmental conditions	OBSERVE	<ul style="list-style-type: none"> ✓ Wind speed within limits ✓ Precipitation and temperature
12. Welding Procedures Specification followed	OBSERVE	<ul style="list-style-type: none"> ✓ Settings on welding equipment ✓ Travel speed ✓ Selected welding materials ✓ Shielding gas type/flow rate ✓ Preheat applied ✓ Interpass temperature maintained (min./max.) ✓ Proper position (F, V, H, OH) ✓ Intermix of filler metals avoided
13. Welding techniques	OBSERVE	<ul style="list-style-type: none"> ✓ Interpass and final cleaning ✓ Each pass within profile limitations ✓ Each pass meets quality requirements

¹ **PERFORM:** Perform these tasks for each weld, fastener or bolted connection, and required verification.

OBSERVE: Observe these items on a random sampling basis daily to insure that applicable requirements are met. Operations need not be delayed pending these inspections at contractor's risk.

STRUCTURAL - STEEL – WELDING SECTION (CONTINUED)

STEEL INSPECTION AFTER WELDING – VERIFY THE FOLLOWING ARE IN COMPLIANCE 2018 IBC 1705.2.1, AISC 360-16: Table C-N5.4-3		
TASK	INSPECTION TYPE ¹	DESCRIPTION
14. Welds cleaned	OBSERVE	
15. Size, length, and location of all welds	PERFORM	Size, length, and location of all welds conform to the requirements of the detail drawings.
16. Welds meet visual acceptance criteria	PERFORM AND DOCUMENT	<ul style="list-style-type: none"> ✓ Crack prohibition ✓ Weld/base-metal fusion ✓ Crater cross section ✓ Weld profiles ✓ Weld size ✓ Undercut ✓ Porosity
17. Arc strikes	PERFORM	
18. k-area	PERFORM	When welding of doubler plates, continuity plates or stiffeners has been performed in the k-area, visually inspect the web k-area for cracks.
19. Backing removed, weld tabs removed and finished, and fillet welds added where required	PERFORM	
20. Repair activities	PERFORM AND DOCUMENT	
21. Document acceptance or rejection of welded joint or member	PERFORM	

END SECTION

¹ **PERFORM:** Perform these tasks for each weld, fastener or bolted connection, and required verification.
DOCUMENT: Document in a report that the work has been performed as required. This is in addition to all other required reports.

STRUCTURAL - STEEL – BOLTING SECTION**ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED: ☒**

STEEL INSPECTION TASKS PRIOR TO BOLTING – VERIFY THE FOLLOWING ARE IN COMPLIANCE 2018 IBC 1705.2.1, AISC 360-16: Table C-N5.6-1		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. Manufacture's certifications available for fastener materials	PERFORM	
2. Fasteners marked in accordance with ASTM requirements	OBSERVE	
3. Proper fasteners selected for joint detail (grade, type, bolt length if threads are to be excluded from shear plane)	OBSERVE	
4. Proper bolting procedure selected for joint detail	OBSERVE	
5. Connecting elements, including appropriate faying surface condition and hole preparation, if specified, meet applicable requirements	OBSERVE	
6. Proper storage provided for bolts, nuts, washers, and other fastener components	OBSERVE	
STEEL INSPECTION TASKS DURING BOLTING – VERIFY THE FOLLOWING ARE IN COMPLIANCE 2018 IBC 1705.2.1, AISC 360-16: Table C-N5.6-2		
TASK	INSPECTION TYPE ¹	DESCRIPTION
7. Fastener assemblies of suitable condition, placed in all holes and washers (if required) are positioned as required	OBSERVE	
8. Joint brought to the snug-tight condition prior to pretensioning operation	OBSERVE	
9. Fastener component not turned by the wrench prevented from rotating	OBSERVE	
10. Bolts are pretensioned in accordance with RCSC Specification, progressing systematically from the most rigid point toward the free edges	OBSERVE	
STEEL INSPECTION TASKS AFTER BOLTING – VERIFY THE FOLLOWING ARE IN COMPLIANCE IBC 1705.2.1, AISC 360-10: Table C-N5.6-3		
TASK	INSPECTION TYPE ¹	DESCRIPTION
11. Document acceptance or rejection of all bolted connections	DOCUMENT	

END SECTION

¹ **PERFORM:** Perform these tasks for each weld, fastener or bolted connection, and required verification.
OBSERVE: Observe these items on a random sampling basis daily to insure that applicable requirements are met. Operations need not be delayed pending these inspections at contractor's risk.
DOCUMENT: Document in a report that the work has been performed as required. This is in addition to all other required reports.

STRUCTURAL - STEEL - NON DESTRUCTIVE TESTING SECTION**ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED: ☒**

NONDESTRUCTIVE TESTING OF WELDED JOINTS – VERIFY THE FOLLOWING ARE IN COMPLIANCE 2018 IBC 1705.2.1, AISC 360-16: Section N5.5		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. Use of qualified nondestructive testing personnel	PERFORM	Visual weld inspection and nondestructive testing (NDT) shall be conducted by personnel qualified in accordance with AWS D1.8 clause 7.2
2. CJP groove welds	OBSERVE	Dye penetrant testing (DT) and ultrasonic testing (UT) shall be performed on 20% of CJP groove welds for materials greater than 5/16" (8mm) thick. Testing rate must be increased to 100% if greater than 5% of welds tested have unacceptable defects.
3. Welded joints subject to fatigue	OBSERVE	Dye penetrant testing (DT) and Ultrasonic testing (UT) shall be performed on 100% of welded joints identified on contract drawings as being subject to fatigue.
4. Weld tab removal sites	OBSERVE	At the end of welds where weld tabs have been removed, magnetic particle testing shall be performed on the same beam-to-column joints receiving UT

END SECTION**STRUCTURAL - STEEL – AISC 341 REQUIREMENTS (SEISMIC PROVISIONS) SECTION****ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED: ☒**

NONDESTRUCTIVE TESTING OF WELDED JOINTS – VERIFY THE FOLLOWING ARE IN COMPLIANCE 2018 IBC 1705.2.1, AISC 341-16: Section J6.2		
TASK	INSPECTION TYPE ²	DESCRIPTION
5. CJP groove welds	OBSERVE	Dye penetrant testing (DT) and ultrasonic testing (UT) shall be performed on 100% of CJP groove welds for materials greater than 5/16" thick (8mm).
6. Beam cope and access hole.	OBSERVE	At welded splices and connections, thermally cut surfaces of beam copes and access holes shall be tested using magnetic particle testing (MT) or dye penetrant testing (DT), when the flange thickness exceeds 1 1/2 in. for rolled shapes, or when the web thickness exceeds 1 1/2 in. for built-up shapes.
7. K-area NDT (AISC 341)	PERFORM	Where welding of doubler plates, continuity plates or stiffeners has been performed in the k-area, the web shall be tested for cracks using magnetic particle testing (MT). The MT inspection area shall include the k-area base metal within 3-inches of the weld. The MT shall be performed no sooner than 48 hours following completion of the welding.
8. Placement of reinforcing or contouring fillet welds	DOCUMENT	

END SECTION

¹ **PERFORM:** Perform these tasks for each weld, fastener or bolted connection, and required verification.

² **PERFORM:** Perform these tasks for each weld, fastener or bolted connection, and required verification.

OBSERVE: Observe these items on a random sampling basis daily to insure that applicable requirements are met. Operations need not be delayed pending these inspections at contractor's risk.

DOCUMENT: Document in a report that the work has been performed as required. This is in addition to all other required reports.

STRUCTURAL - STEEL - COMPOSITE CONSTRUCTION ¹**ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED: ☒**

COMPOSITE CONSTRUCTION PRIOR TO PLACING CONCRETE – VERIFY THE FOLLOWING ARE IN COMPLIANCE 2018 IBC 1705.2.1, AISC 360-16: Table N6.1, AISC 341-16: Table J9.1		
TASK	INSPECTION TYPE ²	DESCRIPTION
1. Placement and installation of steel headed stud anchors	PERFORM	
2. Material identification of reinforcing steel (Type/Grade)	OBSERVE	
3. Determination of carbon equivalent for reinforcing steel other than ASTM A706	OBSERVE	
4. Proper reinforcing steel size, spacing, clearances, support, and orientation	OBSERVE	
5. Reinforcing steel has not been re-bent in the field	OBSERVE	
6. Reinforcing clearances have been provided	OBSERVE	
7. Reinforcing steel has been tied and supported as required	OBSERVE	
8. Composite member has required size	OBSERVE	

END SECTION**STRUCTURAL - STEEL - OTHER INSPECTIONS****ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED: ☒**

OTHER STEEL INSPECTIONS – VERIFY THE FOLLOWING ARE IN COMPLIANCE 2018 IBC 1705.2.1, AISC 341-16: Tables J8.1 & J10.1		
TASK	INSPECTION TYPE ²	DESCRIPTION
1. Anchor rods and other embedments supporting structural steel	PERFORM	Verify the diameter, grade, type, and length of the anchor rod or embedded item, and the extent or depth of embedment prior to placement of concrete.
2. Fabricated steel or erected steel frame including monorail system, railing, ladder, fall protection systems	OBSERVE	Verify compliance with the details shown on the construction documents, such as braces, stiffeners, member locations and proper application of joint details at each connection.
3. Reduced beam sections (RBS) where/if occurs	DOCUMENT	✓ Contour and finish ✓ Dimensional tolerances
4. Protected zones	DOCUMENT	No holes or unapproved attachments made by fabricator or erector
5. H-piles where/if occurs	DOCUMENT	No holes or unapproved attachments made by the responsible contractor

END SECTION

¹ See Concrete Construction Section for all concrete related inspection of composite steel construction.

² **PERFORM:** Perform these tasks for each weld, fastener or bolted connection, and required verification.
OBSERVE: Observe these items on a random sampling basis daily to insure that applicable requirements are met. Operations need not be delayed pending these inspections at contractor's risk.
DOCUMENT: Document in a report that the work has been performed as required. This is in addition to all other required reports.

STRUCTURAL - COLD-FORMED METAL DECK - PLACEMENT SECTION**ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED: ☒**

METAL DECK INSPECTION PRIOR TO DECK PLACEMENT – VERIFY THE FOLLOWING ARE IN COMPLIANCE SDI QA/QC-2011, Appendix 1, Table 1.1		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. Verify compliance of materials (deck and all deck accessories) with construction documents, including profiles, material properties, and base metal thickness	PERFORM	
2. Document acceptance or rejection of deck and deck accessories	DOCUMENT	
METAL DECK INSPECTION DURING DECK PLACEMENT – VERIFY THE FOLLOWING ARE IN COMPLIANCE SDI QA/QC-2011, Appendix 1, Table 1.2		
TASK	INSPECTION TYPE ¹	DESCRIPTION
3. Verify compliance of deck and all deck accessories installation with construction documents	PERFORM	
4. Verify deck materials are represented by the mill certifications that comply with the construction documents	PERFORM	
5. Document acceptance or rejection of installation of deck and deck accessories	DOCUMENT	
METAL DECK INSPECTION AFTER DECK PLACEMENT – VERIFY THE FOLLOWING ARE IN COMPLIANCE SDI QA/QC-2011, Appendix 1, Table 1.3		
TASK	INSPECTION TYPE ¹	DESCRIPTION
6. Welding procedure specification (WPS) available	PERFORM	
7. Manufactures certifications for welding consumables available	OBSERVE	
8. Material identification (type/grade)	OBSERVE	
9. Check welding equipment	OBSERVE	

END SECTION

¹ **PERFORM:** Perform these tasks for each weld, fastener or bolted connection, and required verification.
OBSERVE: Observe these items on a random sampling basis daily to insure that applicable requirements are met. Operations need not be delayed pending these inspections at contractor's risk.
DOCUMENT: Document in a report that the work has been performed as required. This is in addition to all other required reports.

STRUCTURAL - COLD-FORMED METAL DECK – WELDING SECTION**ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED: ☒**

METAL DECK INSPECTION <u>DURING</u> WELDING – VERIFY THE FOLLOWING ARE IN COMPLIANCE SDI QA/QC-2011, Appendix 1, Table 1.4		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. Use of qualified welders	OBSERVE	
2. Control and handling of welding consumables	OBSERVE	
3. Environmental conditions (wind speed, moisture, temperature)	OBSERVE	
4. WPS followed	OBSERVE	
METAL DECK INSPECTION <u>AFTER</u> WELDING – VERIFY THE FOLLOWING ARE IN COMPLIANCE SDI QA/QC-2011, Appendix 1, Table 1.5		
TASK	INSPECTION TYPE ¹	DESCRIPTION
5. Verify size and location of welds, including support, sidelap, and perimeter welds.	PERFORM	
6. Welds meet visual acceptance criteria	PERFORM	
7. Verify repair activities	PERFORM	
8. Document acceptance or rejection of welds	DOCUMENT	

END SECTION

¹ **PERFORM:** Perform these tasks for each weld, fastener or bolted connection, and required verification.
OBSERVE: Observe these items on a random sampling basis daily to insure that applicable requirements are met. Operations need not be delayed pending these inspections at contractor's risk.
DOCUMENT: Document in a report that the work has been performed as required. This is in addition to all other required reports.

STRUCTURAL - COLD-FORMED METAL DECK – FASTENING SECTION**ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED: ☒**

METAL DECK INSPECTION BEFORE MECHANICAL FASTENING – VERIFY THE FOLLOWING ARE IN COMPLIANCE SDI QA/QC-2011, Appendix 1, Table 1.6		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. Manufacturer installation instructions available for mechanical fasteners	OBSERVE	
2. Proper tools available for fastener installation	OBSERVE	
METAL DECK INSPECTION DURING MECHANICAL FASTENING – VERIFY THE FOLLOWING ARE IN COMPLIANCE SDI QA/QC-2011, Appendix 1, Table 1.7		
TASK	INSPECTION TYPE ¹	DESCRIPTION
3. Fasteners are positioned as required	OBSERVE	
4. Fasteners are installed in accordance with manufacturer's instructions	OBSERVE	
METAL DECK INSPECTION AFTER MECHANICAL FASTENING – VERIFY THE FOLLOWING ARE IN COMPLIANCE SDI QA/QC-2011, Appendix 1, Table 1.8		
TASK	INSPECTION TYPE ¹	DESCRIPTION
5. Check spacing, type, and installation of support fasteners	PERFORM	
6. Check spacing, type, and installation of sidelap fasteners	PERFORM	
7. Check spacing, type, and installation of perimeter fasteners	PERFORM	
8. Verify repair activities	PERFORM	
9. Document acceptance or rejection of mechanical fasteners	DOCUMENT	

END SECTION

¹ **PERFORM:** Perform these tasks for each weld, fastener or bolted connection, and required verification.
OBSERVE: Observe these items on a random sampling basis daily to insure that applicable requirements are met. Operations need not be delayed pending these inspections at contractor's risk.
DOCUMENT: Document in a report that the work has been performed as required. This is in addition to all other required reports.

STRUCTURAL - LIGHT GAUGE STEEL FRAMING AND/OR LIGHT GAUGE TRUSSES SECTION**ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED:** ☐

LIGHT GAUGE STEEL CONSTRUCTION AND CONNECTIONS – VERIFY THE FOLLOWING ARE IN COMPLIANCE IBC 1705.2.2, 1705.11.2, 1705.11.3, UFC 4 023 03		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. Trusses spanning 60-feet or greater where/if applies	PERFORM	Verify that temporary and permanent truss restraint/bracing is installed in accordance with approved truss submittal package.
2. Welded connections (seismic and/or wind resisting system)	OBSERVE	Visually inspect all welds composing part of the main wind or seismic force resisting system, including shearwalls, braces, collectors (drag struts), and hold-downs. Critical wind and/or seismic force resisting welds especially at the Entry Canopy and the Metal Stair Canopy Components.
3. Connections (seismic and/or wind resisting system)	OBSERVE	Visually inspect all screw attachment, bolting, anchoring and other fastening of components within the main wind or seismic force resisting system, including roof deck, roof framing, exterior wall covering, wall to roof/floor connections, braces, collectors (drag struts) and hold-downs.
4. Cold-formed steel (progressive collapse resisting system where/if applies)	OBSERVE	Verify proper welding operations, screw attachment, bolting, anchoring and other fastening of components within the progressive collapse resisting system, including horizontal tie force elements, vertical tie force elements and bridging elements (UFC 4 023 03).

END SECTION**STRUCTURAL - OPEN-WEB STEEL JOISTS SECTION****ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED:** ☒

OPEN-WEB STEEL JOISTS AND JOIST GIRDERS – VERIFY THE FOLLOWING ARE IN COMPLIANCE IBC TABLE 1705.2.3		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. Installation of open-web steel joists and joist girders	OBSERVE	<ul style="list-style-type: none"> ✓ End connections – welded or bolted ✓ Bridging – horizontal and diagonal

END SECTION

¹ **PERFORM:** Perform these tasks for each weld, fastener or bolted connection, and required verification.

OBSERVE: Observe these items on a random sampling basis daily to insure that applicable requirements are met. Operations need not be delayed pending these inspections at contractor's risk.

STRUCTURAL - CONCRETE CONSTRUCTION SECTION**ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED: ☒**

CONCRETE CONSTRUCTION, INCLUDING COMPOSITE DECK – VERIFY THE FOLLOWING ARE IN COMPLIANCE IBC TABLE 1705.3 (ACI 318 REFERENCES NOTED IN IBC TABLE)		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. Inspect reinforcement, including prestressing tendons, and verify placement.	OBSERVE	Verify prior to placing concrete that reinforcing is of specified type, grade and size; that it is free of oil, dirt and unacceptable rust; that it is located and spaced properly; that hooks, bends, ties, stirrups and supplemental reinforcement are placed correctly; that lap lengths, stagger and offsets are provided; and that all mechanical connections are installed per the manufacturer's instructions and/or evaluation report.
2. Reinforcing bar welding	OBSERVE	✓ Verify weldability of reinforcing bars other than ASTM A 706 ✓ Inspect single-pass fillet welds, maximum 5/16" in accordance with AWS D1.4
3. All other welding	CONTINUOUS	Visually inspect all welds in accordance with AWS D1.4
4. Cast in place anchors and post installed drilled anchors (downward inclined)	OBSERVE	Verify prior to placing concrete that cast in place anchors and post installed drilled anchors have proper embedment, spacing and edge distance.
5. Post-installed adhesive anchors in horizontal or upward inclined orientations	CONTINUOUS AND DOCUMENT	✓ Inspect as required per approved ICC-ES report ✓ Verify that installer is certified for installation of horizontal and overhead installation applications ✓ Inspect proof loading as required by the contract documents
6. Verify use of required mix design	OBSERVE	Verify that all mixes used comply with the approved construction documents
7. Prior to concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete	CONTINUOUS	At the time fresh concrete is sampled to fabricate specimens for strength test verify these tests are performed by qualified technicians.
8. Inspect concrete and/or shotcrete placement for proper application techniques	CONTINUOUS	Verify proper application techniques are used during concrete conveyance and depositing avoids segregation or contamination. Verify that concrete is properly consolidated.
9. Verify maintenance of specified curing temperature and technique	OBSERVE	Inspect curing, cold weather protection, and hot weather protection procedures.
10. Pre-stressed concrete	CONTINUOUS	Verify application of prestressing forces and grouting of bonded prestressing tendons.

CONTINUED ON FOLLOWING PAGE

¹ **OBSERVE:** Observe these items on a random sampling basis daily to insure that applicable requirements are met. Operations need not be delayed pending these inspections at contractor's risk.

DOCUMENT: Document in a report that the work has been performed as required. This is in addition to all other required reports.

CONTINUOUS: Constant monitoring of identified tasks by a special inspector over the duration of performance of said tasks.

STRUCTURAL - CONCRETE CONSTRUCTION (CONTINUED)

CONCRETE CONSTRUCTION, INCLUDING COMPOSITE DECK – VERIFY THE FOLLOWING ARE IN COMPLIANCE IBC TABLE 1705.3 (ACI 318 REFERENCES NOTED IN IBC TABLE)		
TASK	INSPECTION TYPE ¹	DESCRIPTION
11. Inspect erection of precast concrete members	OBSERVE	
12. Verify in-situ concrete strength, prior to stressing of tendons in post-tensioned concrete and prior to removal of shores and forms from beams and structural slabs.	OBSERVE	
13. Inspect formwork for shape, location and dimensions of the concrete member being formed.	OBSERVE	

END SECTION

¹ **OBSERVE:** Observe these items on a random sampling basis daily to insure that applicable requirements are met. Operations need not be delayed pending these inspections at contractor's risk.

DOCUMENT: Document in a report that the work has been performed as required. This is in addition to all other required reports.

CONTINUOUS: Constant monitoring of identified tasks by a special inspector over the duration of performance of said tasks.

STRUCTURAL - MASONRY CONSTRUCTION SECTION (ALL RISK CATEGORIES)**ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED: ☒**

MASONRY CONSTRUCTION – VERIFY THE FOLLOWING ARE IN COMPLIANCE <u>AT START</u> OF CONSTRUCTION IBC 1705.4 (ACI 530-13 TABLE 3.1.2 & 3.1.3)		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. Compliance with approved submittals prior to start	OBSERVE	
2. Proportions of site-mixed mortar.	OBSERVE	
3. Grade and type of reinforcement, anchor bolts, and prestressing tendons and anchorages	OBSERVE	
4. Prestressing technique	OBSERVE	
5. Properties of thin bed mortar for AAC masonry	OBSERVE	
MASONRY CONSTRUCTION – VERIFY THE FOLLOWING ARE IN COMPLIANCE <u>PRIOR TO</u> GROUTING IBC 1705.4 (ACI 530-13 TABLE 3.1.2 & 3.1.3)		
TASK	INSPECTION TYPE ¹	DESCRIPTION
6. Grout space	OBSERVE	
7. Proportions of site-prepared grout and prestressing grout for bonded tendons	OBSERVE	
8. Proportions of site-mixed grout and prestressing grout for bonded tendons	OBSERVE	
9. Placement of masonry units and mortar joints	OBSERVE	
10. Welding of reinforcement	CONTINUOUS	
MASONRY CONSTRUCTION – VERIFY THE FOLLOWING ARE IN COMPLIANCE <u>DURING</u> CONSTRUCTION IBC 1705.4 (ACI 530-13 TABLE 3.1.2 & 3.1.3)		
TASK	INSPECTION TYPE ¹	DESCRIPTION
11. Size and location of structural elements is in compliance	OBSERVE	
12. Preparation, construction, and protection of masonry during cold weather (temperature below 40°F (4.4°C) or hot weather (temp above 90°F (32.2°C))	OBSERVE	
13. Application and measurement of prestressing force	CONTINUOUS	
14. Placement of grout and prestressing grout for bonded tendons	CONTINUOUS	
15. Placement of AAC masonry units and construction of thin bed mortar joints	CONTINUOUS	Continuous for first 5000 square feet only (465 square meters).
16. Observe preparation of grout specimens, mortar specimens, and/or prisms	OBSERVE	
17. Type, size and placement of reinforcement, connectors, anchor bolts and prestressing tendons and anchorages, including details of anchorage of masonry to structural members, frames, or other construction	OBSERVE	

END SECTION

¹ **OBSERVE:** Observe these items on a random sampling basis daily to insure that applicable requirements are met. Operations need not be delayed pending these inspections at contractor's risk.

CONTINUOUS: Constant monitoring of identified tasks by a special inspector over the duration of performance of said tasks.

STRUCTURAL - WOOD CONSTRUCTION – SPECIALTY ITEMS SECTION**ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED:** ☐

WOOD CONSTRUCTION – VERIFY THE FOLLOWING ARE IN COMPLIANCE IBC 1705.5		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. High-load diaphragms where applicable	OBSERVE	Verify thickness and grade of sheathing, size of framing members at panel edges, nail diameters and length, and the number of fastener lines and that fastener spacing is per approved contract documents.
2. Metal-plate connected wood trusses spanning 60 feet or greater	OBSERVE	Verify that the temporary installation restraint/bracing and the permanent individual truss member restraint/bracing are installed in accordance with the approved truss submittal package

END SECTION**STRUCTURAL - WOOD CONSTRUCTION - SEISMIC & WIND SECTION****THIS SECTION IS APPLICABLE IF BOX IS CHECKED:** ☐

WOOD CONSTRUCTION SEISMIC AND WIND – VERIFY THE FOLLOWING ARE IN COMPLIANCE 2018 IBC 1705.11 & 1705.12.2		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. Nailing, bolting, anchoring and other fastening of elements of the main wind/seismic force-resisting system	OBSERVE (CONTINUOUS FOR GLUING)	Includes connectors for: shearwall sheathing, roof/floor sheathing, drag struts/collectors (double top plates), braces, hold downs, roof connections to exterior walls.

END SECTION**STRUCTURAL – ISOLATION AND ENERGY DISSIPATION SYSTEMS SECTION****ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED:** ☐

ISOLATION AND ENERGY DISSIPATION SYSTEMS – VERIFY THE FOLLOWING ARE IN COMPLIANCE 2018 IBC TABLE 1705.12.8		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. Fabrication and installation	OBSERVE	Verify that fabrication and installation of isolator units and energy dissipation devices conform to manufacturer's recommendations and approved construction documents
2. Testing of seismic isolation Systems in seismically isolated structures		Seismic Isolation Systems in seismically isolated structures shall be tested accordance with ASCE 7, Section 17.8

END SECTION

¹ **OBSERVE:** Observe these items on a random sampling basis daily to insure that applicable requirements are met. Operations need not be delayed pending these inspections at contractor's risk.

GEOTECHNICAL - SOILS INSPECTION SECTION**ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED: ☒**

SOILS INSPECTION – VERIFY THE FOLLOWING ARE IN COMPLIANCE IBC 1705.6		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. Materials below shallow foundations are adequate to achieve the design bearing capacity.	OBSERVE	
2. Excavations are extended to proper depth and have reached proper material	OBSERVE	
3. Perform classification and testing of compacted fill materials	OBSERVE	
4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill	CONTINUOUS	
5. Prior to placement of compacted fill, inspect subgrade and verify that site has been prepared properly.	OBSERVE	During fill placement, the special inspector shall verify that proper materials and procedures are used in accordance with the provisions of the approved geotechnical report

END SECTION**GEOTECHNICAL - DRIVEN DEEP FOUNDATION ELEMENTS SECTION****ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED: ☒**

DEEP DRIVEN FOUNDATION CONSTRUCTION – VERIFY THE FOLLOWING ARE IN COMPLIANCE IBC 1705.7		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. Verify element materials, sizes and lengths comply with requirements	CONTINUOUS	
2. Inspect driving operations and maintain complete and accurate records for each element	CONTINUOUS	
3. Verify placement locations and plumbness, confirm type and size of hammer, record number of blows per foot of penetration, determine required penetrations to achieve design capacity, record tip and butt elevations and document any damage to foundation element	CONTINUOUS	
4. Determine capacities of test elements and conduct additional load tests if required.	CONTINUOUS	
5. For steel or concrete elements, perform additional special inspections in accordance with the Steel and Concrete sections in this schedule		

END SECTION

¹ **OBSERVE:** Observe these items on a random sampling basis daily to insure that applicable requirements are met. Operations need not be delayed pending these inspections at contractor's risk.

CONTINUOUS: Constant monitoring of identified tasks by a special inspector over the duration of performance of said tasks.

GEOTECHNICAL - HELICAL PILE FOUNDATIONS SECTION**ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED: ☒**

HELICAL PILE FOUNDATIONS – VERIFY THE FOLLOWING ARE IN COMPLIANCE 2018 IBC 1705.9		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. Record installation equipment used, pile dimensions, tip elevations, final depth, final installation torque and other pertinent installation data as required. The approved geotechnical report and the contract documents shall be used to determine compliance	CONTINUOUS	

END SECTION**GEOTECHNICAL - CAST IN PLACE DEEP FOUNDATION ELEMENTS SECTION****ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED: ☒**

CAST IN PLACE DEEP FOUNDATION ELEMENTS – VERIFY THE FOLLOWING ARE IN COMPLIANCE 2018 IBC 1705.8		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. Inspect drilling operations and maintain complete and accurate records for each element.	CONTINUOUS	
2. Verify placement locations and plumbness, confirm element diameters, bell diameters (if applicable), lengths, embedment into bedrock (if applicable) and adequate end-bearing strata capacity. Record concrete or grout volumes	CONTINUOUS	For concrete elements, perform additional special inspections in accordance with the Concrete section in this schedule

END SECTION

¹ **CONTINUOUS:** Constant monitoring of identified tasks by a special inspector over the duration of performance of said tasks.

FIRE PROTECTION - SPRAYED FIRE-RESISTANT MATERIALS SECTION**ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED: ☒**

SPRAYED FIRE RESISTANT MATERIALS (SFRM) – VERIFY THE FOLLOWING ARE IN COMPLIANCE 2018 IBC 1705.14		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. Substrate condition	OBSERVE	Prior to application, confirm that surfaces have been prepared according to the approved fire-resistance design and manufacturer's instructions.
2. Material thickness	OBSERVE	Verify SFRM thickness according to 2018 IBC 1705.14.4
3. Material density	OBSERVE	Verify SFRM density according to 2018 IBC 1705.14.5
4. Bond strength	OBSERVE	Verify bond strength of cured SFRM according to IBC 1705.14.6

END SECTION**FIRE PROTECTION - MASTIC AND INTUMESCENT COATINGS SECTION****ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED: ☒**

MASTIC AND INTUMESCENT FIRE-RESISTANT COATINGS – VERIFY THE FOLLOWING ARE IN COMPLIANCE 2018 IBC 1705.15		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. Inspect according to AWCI 12-B and the contract documents	OBSERVE	Inspections shall be performed in accordance with AWCI 12-B, Standard Practice for the Testing and Inspection of Field Applied Thin Film Intumescent Fire-Resistive Materials.

END SECTION**FIRE PROTECTION – FIRE RESISTANT PENETRATIONS AND JOINTS SECTION****ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED: ☒**

FIRE RESISTANT PENETRATIONS AND JOINTS – VERIFY THE FOLLOWING ARE IN COMPLIANCE 2018 IBC 1705.17		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. Inspections of penetration firestop systems conducted in accordance with ASTM E 2174.	OBSERVE	
2. Inspections of fire-resistant joint systems conducted in accordance with ASTM E 2393	OBSERVE	

END SECTION**FIRE PROTECTION – SMOKE CONTROL SECTION****ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED: ☒**

SMOKE CONTROL – VERIFY THE FOLLOWING ARE IN COMPLIANCE 2018 IBC 1705.18		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. Verify device locations and perform leakage testing	OBSERVE	Perform during erection of ductwork and prior to concealment
2. Pressure difference testing, flow measurements and detection and control verification	OBSERVE	Perform prior to occupancy and after sufficient completion

END SECTION

¹ **OBSERVE:** Observe these items on a random sampling basis daily to insure that applicable requirements are met. Operations need not be delayed pending these inspections at contractor's risk.

ARCHITECTURAL - EXTERIOR INSULATION AND FINISH SYSTEMS SECTION**ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED:** ☐

EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS) – VERIFY THE FOLLOWING ARE IN COMPLIANCE 2018 IBC 1705.16		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. Water resistive barrier coating applied over a sheathing substrate.	OBSERVE	Verify that water resistive barrier coating complies with ASTM E 2570.

END SECTION**ARCHITECTURAL – ARCHITECTURAL COMPONENTS****ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED:** ☒

ARCHITECTURAL COMPONENTS – VERIFY THE FOLLOWING ARE IN COMPLIANCE 2018 IBC 1705.12.5, 1705.12.7		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. Erection and fastening of exterior cladding and interior and exterior veneer.	OBSERVE	Verify appropriate materials, fasteners and attachment at commencement of work and at completion. Inspector Note: Inspection not required if height is less than 30 feet or weight is less than 5psf
2. Interior and exterior non-load bearing walls	OBSERVE	Verify appropriate materials, fasteners and attachment at commencement of work and at completion. Inspector Note: Inspection not required if interior non-load bearing walls weigh less than 15psf
3. Access floors	OBSERVE	Verify that anchorage complies with approved construction documents.
4. Storage racks	OBSERVE	Verify that anchorage complies with approved construction documents. Inspection of post-installed anchors shall comply with approved ICC-ES report. Inspector Note: Not required for racks less than 8 feet in height

END SECTION

¹ **OBSERVE:** Observe these items on a random sampling basis daily to insure that applicable requirements are met. Operations need not be delayed pending these inspections at contractor's risk.

PLUMBING/MECHANICAL/ELECTRICAL DESIGNATED SEISMIC SYSTEMS SECTION

ALL OR PORTIONS OF THIS SECTION ARE APPLICABLE IF BOX IS CHECKED: ☒

PLUMBING, MECHANICAL AND ELECTRICAL IBC 1705.12.6		
TASK	INSPECTION TYPE ¹	DESCRIPTION
1. Anchorage of electrical equipment for emergency and standby power systems	OBSERVE	✓ Check for general conformance
2. Anchorage of all other electrical equipment in Seismic Design Categories E and F only (See first page of this schedule for Seismic Design Category)	OBSERVE	✓ Check for general conformance
3. Installation and anchorage of piping designed to carry hazardous materials and their associated mechanical units.	OBSERVE	✓ Check for general conformance
4. Installation and anchorage of vibration isolation systems where the construction documents require a nominal clearance of ¼" or less between support framing and restraint.	OBSERVE	✓ Check for general conformance
5. Verification of clearance between fire sprinkler piping and surrounding mechanical and electrical equipment, including ductwork, piping and their structural supports.	OBSERVE	✓ Check for minimum clearances noted in ASCE7 13.2.3 or a nominal clearance of not less than 3 inches

END SECTION

¹ **OBSERVE:** Observe these items on a random sampling basis daily to insure that applicable requirements are met. Operations need not be delayed pending these inspections at contractor's risk.

SECTION 01 50 00

TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS
11/20, 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.

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C511 (2017) Reduced-Pressure Principle Backflow Prevention Assembly

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2020; ERTA 20-1 2020; ERTA 20-2 2020; TIA 20-1; TIA 20-2; TIA 20-3; TIA 20-4)
National Electrical Code

NFPA 241 (2019) Standard for Safeguarding Construction, Alteration, and Demolition Operations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (2014) Safety and Health Requirements Manual

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

MUTCD (2009; Rev 2012) Manual on Uniform Traffic Control Devices

1.2 SUBMITTALS

Government approval is required for submittals with a "G" classification. Submittals not having a "G" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 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 DOD CONDITION OF READINESS (COR)

DOD will set the Condition of Readiness (COR) based on the weather forecast for sustained winds 50 knots (58 mph) or greater. Contact the Contracting Officer for the current COR setting.

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 Section 01 Emergency Planning 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

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 <http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphics-tables>. 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 must be allowed to have complete and immediate access to the network at any time in order to verify compliance with this specification.

1.6.4 Temporary Wireless IP Networks

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 <http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphics-tables>. 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 Section 01 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.

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 Section 04. 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 Section 04. 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 6 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 Section 11, 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

cast iron 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 Utilities at Special Locations

- a. Reasonable amounts of utilities will be made available at the prevailing Government rates. These rates may be obtained upon application to the Commanding Officer, NAVFAC Mid-Lant, by way of the Contracting Officer. Make connections, provide transformers and meters, and make disconnections; and provide backflow preventer devices on connections to domestic water lines.

3.2.3 Sanitation

Provide and maintain within the construction area minimum field-type sanitary facilities in accordance with EM 385-1-1 Section 02. 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.

3.2.4 Telephone

Make arrangements and pay all costs for telephone facilities desired.

3.2.5 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, and other items, that may be required by the Life Safety Signage, overhead protection 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. Brightly-colored (orange) vests are required for all personnel working in roadways. 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.

3.3.5 Commercial Vehicles In/Out of NAVSTA/NAS Norfolk, VA

a. Definitions. Commercial vans and trucks are differentiated as follows:

- (1) Closed truck. A truck enclosed on four sides, top, and bottom to which entry can be made only through end or side doors and to which a seal can be applied.
- (2) Open truck. A truck which is either fully open, such as flatbed, or contained by wooden slats or sideboards; or any truck to which a seal cannot be applied.
- (3) Commercial vehicles. A common contract or commercial truck without a decal issued by Norfolk, VA.
- (4) Trailer. A non-self-propelled enclosed cargo container used for the transportation of goods, e.g., a trailer pulled by a truck.

b. Instructions and directions. Ensure that commercial trucks and trailers follow the instructions below to provide for effective control over their entry and exit from the base, movement within the base, and to reduce congestion both at the gates and within the base. In general, commercial trucks and common carriers are required to enter and exit through specified gates and process immediately to a truck control point for cargo manifest check. The driver shall be issued a Material Movement Control and Gate Pass, routing instructions, and directions to depart the base via a designated exit point where the pass is to be turned in.

- (1) Common contract and commercial trucks going to the area of Building LP-84 (MAC Terminal), NAS Norfolk shall enter and exit Gate 22. Gate 22 hours of operations are 5:30 a.m. through 6:30 p.m. and 10:30 p.m. through 3:00 a.m., 7 days a week. The gate is closed on holidays.
- (2) Other common contract and commercial trucks, except as noted below are allowed to enter the Naval Base through any Gate and exit through Gate 2.
- (3) Common contract and commercial trucks which enter the base may depart through Gate 5, Gate 4, and Gate 22 only. The exit Truck Control Point at Gate 4 is operated from 7:00 a.m. to 5:00 p.m.
- (4) For concrete- and asphalt-carrying trucks, the Resident Officer in Charge of Construction (ROICC), Norfolk VA shall arrange entry and exit through any gate other than Gate 2.
- (5) Contractor vehicles with black Norfolk Naval Base decals shall be granted routine access to the base at all times. These trucks shall not enter or exit the base through Gate 2. These trucks are subject to random checks and searches at exit gates like other personal and commercial vehicles to ensure that Government property is not being taken off the base without authorization and documentation.

c. Movement and Exit

- (1) Material movement control and gate pass. A Material Movement

Control and Gate Pass (5ND GEN 5510/1) is required for the removal of Government, public, or private property from NAVSTA and NAS Norfolk complex via commercial vans and truck.

(a) The Material Movement Control and Gate Pass shall be originated by the Naval Base Police Truck Control Officer, and shall be given to drivers of commercial trucks for retention during transit to intermediate stops and to the exit gates. The pass shall be presented by the driver to the Truck Control Officer at the exit truck stop. If the driver has more than one delivery or pickup point, the driver shall present the pass at each stop so the new activity may fill in appropriate information on the pass. A copy of the pass shall be retained by each activity after appropriate information has been entered; remaining copies of the pass shall be returned to the driver. Passes are subject to review by the Naval Base Police Department during transit and within command areas by activity officials for verification of cargo content and to determine if drivers are transiting promptly and by the proper route. For trailers expecting to be picked up and depart outside normal working hours, pre-prepared passes shall be provided by the activity duty officer or authorized supervising person prior to close of working hours. Trucking companies expecting to pick up trailers after working hours should be instructed to pick up a Material Movement Control and Gate Pass from the responsible activity. The activity duty officer or official shall notify Base Police Headquarters to clear the truck for exit at Gate 5 if the seal and Material Movement Control and Gate Pass are in order.

(b) When filling out a Material Movement Control and Gate Pass, the last activity where business is conducted on the base is responsible to ensure that the original of the pass is given to the driver to turn in to the Truck Control officer at the truck control stops.

(c) The Material Movement Control and Gate Pass shall be turned in by the vehicle driver to a base police officer at a truck control stop when he departs from the base.

(d) Government or commercial vehicles departing Naval Base, Norfolk with Government, public, or private property shall possess a Material Movement Control and Gate Pass filled out by a naval officer or equivalent grade civilian within the driver's chain of command. The Material Movement Control and Gate Pass shall be inspected and verified during random gate departure searches.

(2) Car Seals

(a) Commercial, sealable, closed trailers and trucks, full, partially full, or empty, destined to leave the base shall be sealed upon departure from any activity. The seal number and trailer or truck number shall be entered on the Material Movement Control and Gate Pass.

(b) Commercial closed trailers and trucks received empty for loading with Government material shall have a Navy car seal affixed to cargo doors after loading and prior to departing through designated gates.

(c) Closed trailers and trucks which have been only partially loaded or off-loaded shall be sealed completely at the end of working hours with a Navy car seal.

(d) Application of Navy car seals is the responsibility of the activity in charge of loading and unloading of trailers and trucks.

(e) The Naval Base Police Department will conduct random checks of contents, seals, and forms of trailers and trucks on the Naval Base complex.

(f) A truck driver whose van or truck does not have a properly completed Material Movement Control and Gate Pass or car seal will be refused exit clearance.

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 monthly 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 Section 04. 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.

3.5.2 Storage Area

Construct a temporary 6 foot high chain link fence around trailers and materials. 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. Grassed or unpaved areas, which are not established roadways, and will be traversed with construction equipment or other vehicles, must be covered with a layer of gravel as necessary to prevent rutting and the tracking of mud onto paved or established roadways, should the Contractor elect to traverse them with construction equipment or other vehicles. Mow and maintain grass located within the boundaries of the construction site for the duration of the project. Grass and vegetation along fences, buildings, under trailers, and in areas not accessible to mowers must be edged or trimmed neatly.

3.5.3 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.

3.5.4 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.

3.5.5 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 24 by 24 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).	

3.5.6 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.

3.5.7 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.

3.5.7.1 Building and Site Storm Protection

When a warning of gale force winds is issued, take precautions to minimize danger to persons, and protect the work and nearby Government property. Precautions 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 CLEANUP

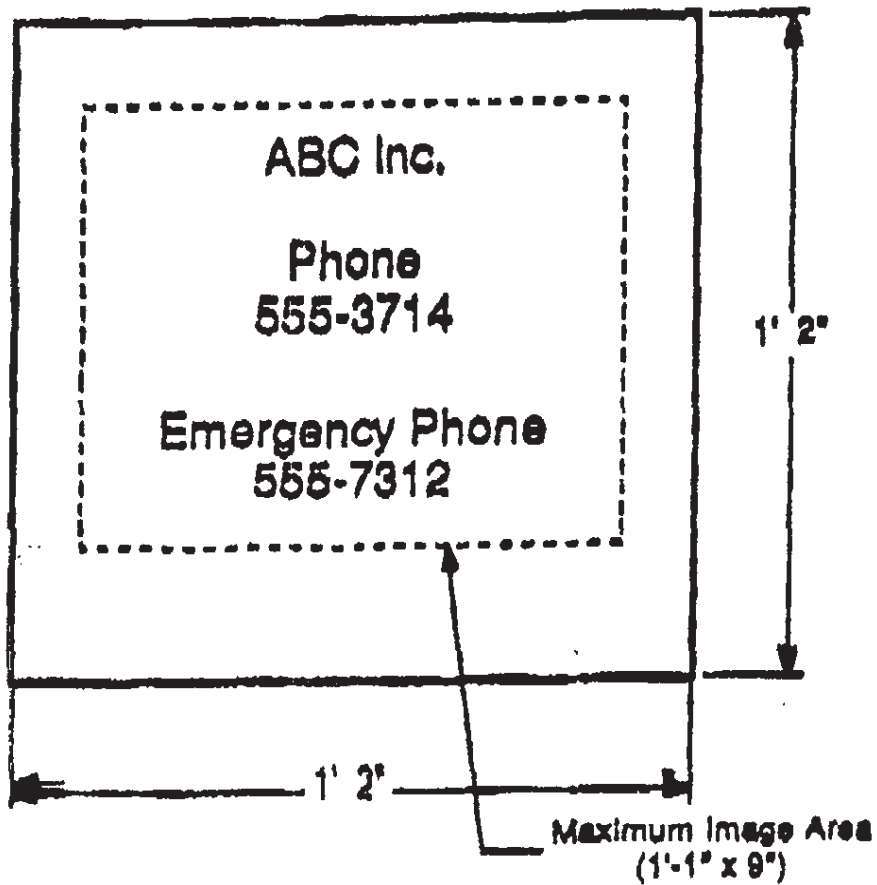
Remove construction debris, waste materials, packaging material and the like from the work site daily. Any dirt or mud which is tracked onto paved or surfaced roadways must be cleaned away. Store all salvageable materials resulting from demolition activities within the fenced area described above or at the supplemental storage area. Neatly stack stored materials not in trailers, whether new or salvaged.

3.9 RESTORATION OF STORAGE AREA

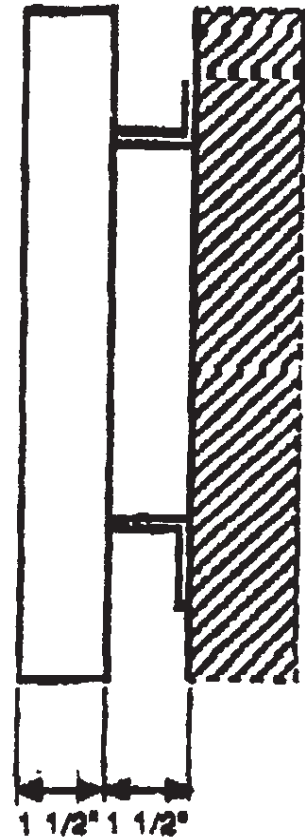
Upon completion of the project remove the bulletin board, signs, barricades, haul roads, and all other temporary products from the site. After removal of trailers, materials, and equipment from within the fenced area, remove the fence. Restore areas used during the performance of the Contract to the 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 --

SIGN FACE



MOUNTING DETAIL



Sign requirements:

Graphic panel: Aluminum, painted blue
Copy: Screen painted or vinyl die-cut, white
Typeface: Univers 65 u/lc

SECTION 01 57 19

TEMPORARY ENVIRONMENTAL CONTROLS

11/15, CHG 5: 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.

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA SW-846 (Third Edition; Update IV) 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 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	National Emission Standards for Hazardous Air Pollutants
40 CFR 63	National Emission Standards for Hazardous Air Pollutants for Source Categories
40 CFR 64	Compliance Assurance Monitoring
40 CFR 112	Oil Pollution Prevention
40 CFR 241	Guidelines for Disposal of Solid Waste
40 CFR 243	Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste
40 CFR 258	Subtitle D Landfill Requirements
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 261.7	Residues of Hazardous Waste in Empty

Containers

40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 262.31	Standards Applicable to Generators of Hazardous Waste-Labeling
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 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 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 materials as defined in 49 CFR 171 and listed in 49 CFR 172.

Hazardous material is any material that: Is regulated as a hazardous material in accordance with 49 CFR 173; or requires a Safety Data Sheet (SDS) in accordance with 29 CFR 1910.120; 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 exhibit 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.

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 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 Regulated Waste

Regulated waste are solid wastes that have specific additional federal, state, or local controls for handling, storage, or disposal.

1.2.14 Sediment

Sediment is soil and other debris that have eroded and have been transported by runoff water or wind.

1.2.15 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:

1.2.15.1 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 maybe 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.

1.2.15.2 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.

1.2.15.3 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.

1.2.15.4 Non-Hazardous Waste

Non-hazardous waste is waste that is excluded from, or does not meet, hazardous waste criteria in accordance with 40 CFR 263.

1.2.15.5 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 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 not be included as recyclable if sold to a scrap metal company. 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.

1.2.15.6 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.

1.2.15.7 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.

1.2.15.8 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.

1.2.16 Surface Discharge

Surface discharge means discharge of water into drainage ditches, storm sewers, creeks or "waters of the United States". Surface discharges are

discrete, identifiable sources and require a permit from the governing agency. Comply with federal, state, and local laws and regulations.

1.2.17 Wastewater

Wastewater is the used water and solids from a community that flow to a treatment plant.

1.2.17.1 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.

1.2.18 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.

1.2.19 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.

1.2.20 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" classification. Submittals not having a "G" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Preconstruction Survey

Solid Waste Management Permit; G

Regulatory Notifications; G

Environmental Protection Plan; G

Stormwater Pollution Prevention Plan (SWPPP); G

Stormwater Notice of Intent (for NPDES coverage under the general

permit for construction activities); G

Dirt and Dust Control Plan; G

Employee Training Records; G

Environmental Manager Qualifications; G

SD-06 Test Reports

Laboratory Analysis

Monthly Solid Waste Disposal Report; G

SD-07 Certificates

Employee Training Records; G

ECATTS Certificate Of Completion; G

Erosion and Sediment Control Inspector Qualifications

SD-11 Closeout Submittals

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

Disposal Documentation for Hazardous and Regulated Waste; G

Assembled Employee Training Records; G

Solid Waste Management Permit; G

Project Solid Waste Disposal Documentation Report; G

Contractor Hazardous Material Inventory Log; G

Hazardous Waste/Debris Management; G

Regulatory Notifications; G

Sales Documentation; G

Contractor Certification

As-Built Topographic Survey

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 and other staff, 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 QUALITY ASSURANCE

1.5.1 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.

1.5.2 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 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).

1.5.3 Environmental Brief

Attend an environmental brief to be included in the preconstruction meeting. Provide the following information: types, quantities, and use of hazardous materials that will be brought onto the 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). 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.

1.5.4 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.

1.5.5 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. Ensure every employee completes a program of classroom instruction or on-the-job training that teaches them to perform their duties in a way that ensures compliance with federal, state and local regulatory requirements for RCRA Large Quantity Generator. Provide a Position Description for each employee, by subcontractor, based on the Davis-Bacon Wage Rate designation or other equivalent method, evaluating the employee's association with hazardous and regulated wastes. This Position Description will include training requirements as defined in 40 CFR 265 for a Large Quantity Generator facility. Submit these Assembled Employee Training Records to the Contracting Officer at the conclusion of the project, unless otherwise directed.

Train personnel to meet state requirements. Conduct environmental protection/pollution control meetings for personnel prior to commencing construction activities. Contact 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. Provide copy of the Erosion and Sediment Control Inspector Qualifications Certification as required by state.

1.5.6 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.

1.6 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 Contract award 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. 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:

1.6.1 General Overview and Purpose

1.6.1.1 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, wastewater 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, and Non-Hazardous Solid Waste Disposal Plan.

1.6.1.2 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.

1.6.1.3 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.

1.6.1.4 Communications

Communication and training procedures that will be used to convey environmental management requirements to Contractor employees and subcontractors.

1.6.1.5 Contact Information

Emergency contact information contact information (office phone number, cell phone number, and e-mail address).

1.6.2 General Site Information

1.6.2.1 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.

1.6.2.2 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.

1.6.2.3 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.

1.6.3 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

1.6.4 Protection of Historical and Archaeological Resources

- a. Objectives

- b. Methods

1.6.5 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).

1.6.6 Protection of the Environment from Waste Derived from Contractor Operations

Control and disposal of solid and sanitary waste. Control and disposal of hazardous waste.

This item consist of the management procedures for hazardous waste to be generated. The elements of those procedures will coincide with the Installation Hazardous Waste Management Plan. The Contracting Officer will provide a copy of the Installation Hazardous Waste Management Plan. 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.

1.6.7 Prevention of Releases to the Environment

Procedures to prevent releases to the environment

Notifications in the event of a release to the environment

1.6.8 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.

1.6.9 Clean Air Act Compliance

1.6.9.1 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.

1.6.9.2 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).

1.6.9.3 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 emergency and non-emergency operation.

1.6.9.4 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.

1.6.9.5 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.

1.6.9.6 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.

1.7 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 general use permitted equipment the Contractor plans to use on site. This paragraph supplements the Contractor's responsibility under FAR 52.236-7 Permits and Responsibilities.

- a. See Section 01 57 19.01 20 - SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS, Section 1.3.1.2 "Erosion and Sediment Control Measures and Stormwater Management" and Section 1.3.1.3 "Virginia Stormwater Management" for additional permit requirements.

1.8 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.

1.9 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.

1.9.1 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.

1.10 FACILITY HAZARDOUS WASTE GENERATOR STATUS

Naval Station Norfolk 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, 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 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.

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

Comply with the requirements provided in Section 01 57 19.01 20
SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS.

3.2.1.1 Stormwater Pollution Prevention Plan

Comply with the requirements provided in Section 01 57 19.01 20
SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS.

3.2.1.2 Stormwater Notice of Intent for Construction Activities

Comply with the additional requirements in Section 01 57 19.01 20
SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS.

3.2.1.3 Inspection Reports

Provide Inspection Reports in accordance with 01 57 19.01 20 SUPPLEMENTAL
TEMPORARY ENVIRONMENTAL CONTROLS.

3.2.1.4 Stormwater Pollution Prevention Plan Compliance Notebook

Comply with the requirements provided in Section 01 57 19.01 20
SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS.

3.2.1.5 Stormwater Notice of Termination for Construction Activities

Comply with the requirements provided in Section 01 57 19.01 20
SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS. Prepare as-built
topographic survey information required by the permitting agency for
certification of the stormwater management system, and provide to the
Contracting Officer.

3.2.2 Erosion and Sediment Control Measures

Comply with the requirements provided in Section 01 57 19.01 20
SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS.

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, any 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 requirements of Section 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS.

3.3 SURFACE AND GROUNDWATER

3.3.1 Cofferdams, Diversions, and Dewatering

Construction operations for dewatering, removal of cofferdams, tailrace excavation, and tunnel closure 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. 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.

If the construction dewatering is noted or suspected of being contaminated, it may only be released to the storm drain system if the discharge is specifically permitted. Obtain authorization for any contaminated groundwater release in advance from the Installation Environmental Officer and the federal or state authority, as applicable. Discharge of hazardous substances will not be permitted under any circumstances.

3.3.2 Waters of the United States

Do not enter, disturb, destroy, or allow discharge of contaminants into waters of the United States.

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.

3.5 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 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.

3.5.2 Burning

Burning is prohibited on the Government premises.

3.5.3 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.

3.5.4 Accidental Venting of Refrigerant

Accidental venting of a refrigerant is a release and must be reported immediately to the Contracting Officer.

3.5.5 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.

3.5.6 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.

3.5.6.1 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.

3.5.6.2 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.

3.5.7 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 through the Contracting Officer on the first working day after each fiscal year quarter, starting the first quarter that nonhazardous solid waste has been generated. Include the following in the report:

Construction and Demolition (C&D) Debris Disposed	cubic yards or tons, as appropriate
C&D Debris Recycled	cubic yards or tons, as appropriate
C&D Debris Composted	cubic yards or tons, as appropriate
Total C&D Debris Generated	cubic yards or tons, as appropriate
Waste Sent to Waste-To-Energy Incineration Plant (This amount should not be included in the recycled amount)	cubic yards or tons, 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 261 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 inclusive): 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.

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.

3.7.1.1.3 Analysis Type

Identify hazardous waste by analyzing for the following characteristics: ignitability, corrosivity, reactivity, and toxicity based on TCLP results.

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 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. 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.

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 40 CFR 262.34 and applicable state or local regulations. Individual waste streams will be limited to 55 gallons of accumulation (or 1 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 accumulation point be established. Submit a request in writing to the Contracting Officer.

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, 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

Determine the Department of Transportation's (DOT's) proper shipping names for waste (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 262.31 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. Section 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS

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 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 Section 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS 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 Installation Fire Department, the Installation Command Duty Officer, the Installation Environmental Office, the Contracting Officer and the state or local authority.

Submit verbal and written notifications as required by 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 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 prior to being treated to remove pollutants. Dispose of the construction- related waste water off-Government property in accordance with 40 CFR 403, state, regional, and local laws and regulations.

3.7.6.1.2 Surface Discharge

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 or discharged into the sanitary sewer with prior approval and notification to the Wastewater Treatment Plant's Operator.

3.8 HAZARDOUS MATERIAL MANAGEMENT

Include hazardous material control procedures in the Safety Plan, 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.

3.8.1 Contractor Hazardous Material Inventory Log

Submit the "Contractor Hazardous Material Inventory Log"(found at: <http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-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 40 CFR 61. Refer to Section 02 82 00 ASBESTOS REMEDIATION. Manifest asbestos-containing waste and provide the manifest to the Contracting Officer. Notifications to the state 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 MILITARY MUNITIONS

In the event military munitions, as defined in 40 CFR 260, are discovered or uncovered, immediately stop work in that area and immediately inform the Contracting Officer.

3.15 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.

3.15.1 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.

3.15.2 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 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.

3.16 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 Contracting Officer. Do not disturb this material until authorized by the Contracting Officer.

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.

3.19 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.

-- End of Section --

CONTRACTOR HAZARDOUS MATERIAL INVENTORY LOG
(EPRCA)
Continuation Sheet

PRIME COMPANY NAME: _____ CONTRACT NO: _____

PROJECT TITLE / LOCATION: _____

Material Name	Manufacturer	MSDS Number	State (i.e. Liquid, Solid, Gas)	Storage Quantity		Quality (lbs/gals) used in Calendar Year []
				Average Daily	Max Daily	

SECTION 01 57 19.01 20

SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS
11/15, CHG 5: 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. If state or local references are not provided here, refer to Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS for appropriate references.

ASTM INTERNATIONAL (ASTM)

ASTM E2356	(2018) Standard Practice for Comprehensive Building Asbestos Surveys
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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. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities

1.2 SUBMITTALS

Government approval is required for submittals with a "G" classification. Submittals not having a "G" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

1.3 MID-ATLANTIC

Comply with the following state, regional, and local requirements which supplement Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS.

1.3.1 Virginia

1.3.1.1 Definition and Disposal Requirements of Empty Paint Cans

Paint Cans: Paint cans that are empty (free of liquids and contains less than one inch of dried material) 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. Contact NAVFAC MIDLANT Environmental Services for management requirements.

1.3.1.2 Erosion and Sediment Control Measures and Stormwater Management

1.3.1.2.1 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.

1.3.1.2.2 Construction Dewatering

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.

1.3.1.3 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.

1.3.1.3.1 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.

1.3.1.3.2 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.

1.3.1.4 Asbestos Abatement and Notification Procedures

Structures must be surveyed for the presence of asbestos prior to demolition or renovation. 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 LF, 160 SF, or 35 CF. 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.

1.3.1.4.1 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.

1.3.1.4.2 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.

1.3.1.5 Hazardous Waste Requirements for Virginia Installations:

1.3.1.5.1 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.

1.3.1.5.2 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.

1.3.1.5.3 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.

1.3.1.5.3.1 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.

1.3.1.5.3.2 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.

1.3.1.5.3.3 Waste Disposal

- a. The Navy will be considered the "generator" for any and all waste 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.

1.3.1.5.4 Excavation

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. Soil may be stockpiled until the end of the project, then reused as much as possible prior to sampling and analysis for residual soil to be disposed. Store in a manner that prevents rain from infiltrating the soil matrix and preventing any runoff into the

surrounding soil or pavement (for example, store the soil on top of plastic sheets and covered with plastic sheets or store in lined, covered dumpsters). If the soil is going to be relocated or disposed outside the construction site, sampling and analysis is required. Contact the installation HW Program Manager prior to disposal to determine the appropriate sampling and test parameter. Soil disposal requirements will depend on test results. 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 EV Pest Management Coordinator for additional information.

1.3.1.5.5 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.

1.3.1.5.6 Dumpsters

Label trash containers to appropriately describe the contents.

1.3.1.6 Air Requirements:

1.3.1.6.1 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.

1.3.1.7 Spill Response and Reporting

Report spills at Hampton Roads Navy installations to the appropriate installation Emergency Call Center (ECC) 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.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

02/19, CHG 2: 08/21

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 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 any 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 streams not listed:

- a. Land Clearing Debris
- b. Asphalt
- c. Masonry and CMU
- d. Concrete
- e. Metals (e.g. banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized, stainless steel, aluminum, copper, zinc, bronze, etc.)
- 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" classification. Submittals not having a "G" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Construction Waste Management Plan; G

SD-11 Closeout Submittals

Final Construction Waste Diversion Report

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 00.05 20 DESIGN AND CONSTRUCTION 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 15 calendar days after notice to proceed. Revise and resubmit Construction Waste Management Plan until it receives final approval from the Contracting Officer, in order for construction to begin. Execute demolition 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/or 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 any 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.

Distribute copies of the waste management plan to each subcontractor, Environmental Manager, and the Contracting Officer.

1.7 RECORDS (DOCUMENTATION)

1.7.1 General

Maintain records to document the types and quantities of waste generated and diverted through re-use, recycling and/or sale to third parties; through disposal to a landfill or incinerator facility. Provide explanations for any 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

Provide Final Construction Waste Diversion Report at the end of the project.

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 described herein:

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 Co-Mingled Method

Place waste products and recyclable materials into a single container and then transport to an authorized recycling facility, which meets all applicable requirements to accept and dispose of recyclable materials in accordance with all applicable local, state and federal regulations. The Co-mingled materials must be sorted and processed in accordance with the approved Construction Waste Management Plan.

1.9.3 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 (2005; R 2011) 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 (2014; with Change 4, 2018) Navy and Marine Corps Design

UFC 1-300-08 (2009, with Change 2, 2011) 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 shall be 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" classification. Submittals not having a "G" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Warranty Management Plan

Warranty Tags

Final Cleaning

Spare Parts Data

SD-08 Manufacturer's Instructions

Posted Instructions

SD-10 Operation and Maintenance Data

Operation and Maintenance Manuals; G

SD-11 Closeout Submittals

As-Built Drawings; G

Record Drawings; G

As-Built Record of Equipment and Materials

Certification of EPA Designated Items; G

Certification Of USDA Designated Items; G

Interim DD FORM 1354; G

Checklist for DD FORM 1354; G

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, 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, fire protection and alarm systems, sprinkler systems, and lightning protection systems.

- d. As-Built Record of 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)."

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)."

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 or 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

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 OPERATION AND MAINTENANCE MANUALS

Provide project operation and maintenance manuals as specified in Section 01 78 23 OPERATION AND MAINTENANCE DATA. Provide four electronic copies of the Operation and Maintenance Manual files. Submit to the Contracting Officer for approval within 60 calendar days of the Beneficial Occupancy Date (BOD). Update and resubmit files for final approval at BOD.

3.4 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.

3.5 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.

3.5.1 Interim DD FORM 1354

Near the completion of Project, but a minimum of 60 days prior to final acceptance of the work, complete, update draft DD FORM 1354 attached to this section, 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.

3.5.2 Completed DD FORM 1354

Submit the completed Checklist for DD FORM 1354 of Installed Building Equipment items. Attach this list to the updated DD FORM 1354.

-- End of Section --

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

08/15, CHG 2: 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 (2005; R 2011) Standard Guide for Stewardship for the Cleaning of Commercial and Institutional Buildings

1.2 SUBMITTALS

Government approval is required for submittals with a "G" classification. Submittals not having a "G" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-10 Operation and Maintenance Data

O&M Database; G

Training Plan; G

Training Outline; G

Training Content; G

SD-11 Closeout Submittals

Training Video Recording; G

Validation of Training Completion; G

1.3 OPERATION AND MAINTENANCE DATA

Submit Operation and Maintenance (O&M) Data for the provided equipment, product, or system, defining the importance of system interactions, troubleshooting, and long-term preventive operation and maintenance. Compile, prepare, and aggregate O&M data to include clarifying and updating the original sequences of operation to as-built conditions. Organize and present information in sufficient detail to clearly explain O&M requirements at the system, equipment, component, and subassembly level. Include an index preceding each submittal. Submit in accordance with this section and Section 01 33 00 SUBMITTAL PROCEDURES.

1.3.1 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.

1.3.2 Package Content

Provide data package content in accordance with paragraph SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES. Comply with the data package requirements specified in the individual technical sections, including the content of the packages and addressing each product, component, and system designated for data package submission.

1.3.3 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.

1.4 O&M DATABASE

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 a minimum, provide list of system equipment, location installed, warranty expiration date, manufacturer, model, and serial number.

1.5 OPERATION AND MAINTENANCE MANUAL FILE FORMAT

Assemble data packages into electronic Operation and Maintenance Manuals. Assemble each manual into a composite electronically indexed 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 electronically linked operation and maintenance directory.

1.5.1 Organization

Bookmark Product and Drawing Information documents using the current version of CSI MasterFormat numbering system, and arrange submittals using the specification sections as a structure. Use CSI MasterFormat and UFGS numbers along with descriptive bookmarked titles that explain the content of the information that is being bookmarked.

1.5.2 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 TYPES OF INFORMATION REQUIRED IN O&M DATA PACKAGES

The following are a detailed description of the data package items listed in paragraph SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES.

1.6.1 Operating Instructions

Provide specific instructions, procedures, and illustrations for the following phases of operation for the installed model and features of each system:

1.6.1.1 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 GOVERNMENT SAFETY REQUIREMENTS. Provide recommended safeguards for each identified hazard.

1.6.1.2 Operator Prestart

Provide procedures required to install, set up, and prepare each system for use.

1.6.1.3 Startup, Shutdown, and Post-Shutdown Procedures

Provide narrative description for Startup, Shutdown and Post-shutdown operating procedures including the control sequence for each procedure.

1.6.1.4 Normal Operations

Provide Control Diagrams with data to explain operation and control of systems and specific equipment. Provide narrative description of Normal Operating Procedures.

1.6.1.5 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.

1.6.1.6 Operator Service Requirements

Provide instructions for services to be performed by the operator such as lubrication, adjustment, inspection, and recording gauge readings.

1.6.1.7 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.

1.6.1.8 Operating Log

Provide forms, sample logs, and instructions for maintaining necessary operating records.

1.6.1.9 Additional Requirements for HVAC Control Systems

Provide Data Package 5 and the following for control systems:

- 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. Full as-built sequence of operations.
- c. Copies of checkout tests and calibrations performed by the Contractor (not Cx tests).
- d. 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
- e. Full print out of all schedules and set points after testing and acceptance of the system.
- f. Full as-built print out of software program.
- g. Marking of system sensors and thermostats on the as-built floor plan and mechanical drawings with their control system designations.

1.6.2 Preventive Maintenance

Provide the following information for preventive and scheduled maintenance to minimize repairs for the installed model and features of each system.

Include potential environmental and indoor air quality impacts of recommended maintenance procedures and materials.

1.6.2.1 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.
- c. A Lubrication Schedule showing service interval frequency.

1.6.2.2 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 craft requirements by type of craft. For periodic calibrations, provide manufacturer's specified frequency and procedures for each separate operation.

- a. Define the anticipated time required to perform each of 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.

1.6.2.3 Cleaning Recommendations

Provide environmentally preferable cleaning recommendations in accordance with ASTM E1971.

1.6.3 Repair

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.

1.6.3.1 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.

1.6.3.2 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.

1.6.3.3 Repair Procedures

Provide instructions and a list of tools required to repair or restore the product or equipment to proper condition or operating standards.

1.6.3.4 Removal and Replacement Instructions

Provide step-by-step procedures and a list of required 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.

1.6.3.5 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.

1.6.3.6 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.

1.6.4 Appendices

Provide information required below and information not specified in the preceding paragraphs but pertinent to the maintenance or operation of the product or equipment. Include the following:

1.6.4.1 Product Submittal Data

Provide a copy of SD-03 Product Data submittals documented with the required approval.

1.6.4.2 Certificates

Provide a copy of SD-07 Certificates submittals documented with the required approval.

1.6.4.3 Manufacturer's Instructions

Provide a copy of SD-08 Manufacturer's Instructions submittals documented with the required approval.

1.6.4.4 O&M Submittal Data

Provide a copy of SD-10 Operation and Maintenance Data submittals documented with the required approval.

1.6.4.5 Parts Identification

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 parts catalog.

1.6.4.6 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. Include warranty information for primary components of the system. Provide copies of warranties required by Section 01 78 00 CLOSEOUT SUBMITTALS.

1.6.4.7 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.

1.6.4.8 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.

1.6.4.9 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.

1.6.4.10 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.

1.6.4.11 Field Test Reports and Manufacturer's Field Reports

Provide a copy of Field Test Reports (SD-06) and Manufacturer's Field Reports (SD-09) submittals documented with the required approval.

1.6.4.12 Contractor Information

Provide a list that includes the name, address, and telephone number 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.

1.7 SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES

Provide the O&M data packages specified in individual technical sections. The information required in each type of data package follows:

1.7.1 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

1.7.2 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

1.7.3 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

1.7.4 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

1.7.5 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

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 eOMSI Manual, as submitted in Section 01 78 24.00 20 FACILITY ELECTRONIC OPERATION AND MAINTENANCE SUPPORT INFORMATION (eOMSI). Training must include classroom or field lectures based on the system operating requirements. The location of classroom training requires approval by the Contracting Officer.

3.1.1.1 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 Quality Control Manager (QC) prior to forwarding to the Contracting Officer. Also, coordinate the training schedule with the Contracting Officer and QC. 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.

3.1.1.2 Training Content

The core of this training must be based on manufacturer's recommendations and the operation and maintenance information. The QC is responsible for overseeing and approving the content and adequacy of the training. Provide a brief summary of the FACILITY INFORMATION manual, and a more detailed presentation of the PRODUCT AND DRAWING MANUAL, specified in Section 01 78 24.00 20 FACILITY ELECTRONIC OPERATION AND MAINTENANCE SUPPORT INFORMATION (eOMSI). 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 eOMSI Manual files as specified in Section 01 78 24.00 20, FACILITY ELECTRONIC OPERATION AND MAINTENANCE SUPPORT INFORMATION (eOMSI), 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 QC in accordance with Section 01 45
00.05 20 DESIGN AND CONSTRUCTION QUALITY CONTROL FOR DESIGN-BUILD.

-- End of Section --

SECTION 01 78 24.00 20

FACILITY ELECTRONIC OPERATION AND MAINTENANCE SUPPORT INFORMATION (eOMSI)
02/15, CHG 3: 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.

U.S. DEPARTMENT OF DEFENSE (DOD)

FC 1-300-09N (2014; with Change 4, 2018) Navy and
Marine Corps Design

1.2 DEFINITIONS AND ABBREVIATIONS

1.2.1 eOMSI Manual

Manual (PDF file) provided by the Contractor that includes, but is not limited to, product information, a facility description with photos, and a list of primary facility systems.

1.2.2 eOMSI Facility Data Workbook (FDW)

A Microsoft Excel file containing required facility information populated by the Contractor.

1.2.3 Systems

The words "system", "systems", and "equipment", when used in this document refer to as-built systems and equipment.

1.2.4 Computer Assisted Design and Drafting (CADD)

Electronic Computer Assisted Design and Drafting graphic software program that is used to create facility design contract documents and Record Drawings.

1.2.5 KTR

An abbreviation for "Contractor."

1.3 eOMSI MEETINGS

1.3.1 Post-Award Kickoff Meeting

Be prepared to discuss the following during this meeting:

- a. eOMSI Manual and eOMSI Facility Data Workbook Coordination Meeting
- b. Processes and methods of gathering eOMSI Manual and eOMSI Facility Data Workbook information during construction.
- c. The eOMSI Submittals schedule. Include the eOMSI submittal schedule

on the Baseline Network Analysis Schedule (NAS) in accordance with Section 01 32 17.00 20 COST-LOADED NETWORK ANALYSIS SCHEDULE (NAS).

- d. Electronic eOMSI Facility Data Workbook file for Contractor's use and completion.

1.3.2 eOMSI Manual and Facility Data Workbook Coordination Meeting

Facilitate a meeting after the Pre-Construction Meeting prior to the submission of the eOMSI Progress Submittal. Meeting attendance must include the Contractor's eOMSI Manual and Facility Data Workbook Preparer, Designer of Record (DOR), and Quality Control Manager, and the Government's Design Manager (DM), Contracting Officer's Representative, and NAVFAC Public Works (PW) Facilities Management Division (FMD). 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 eOMSI and coordinate the efforts necessary by both the Government and Contractor to ensure an accurate collection, preparation and timely Government review of eOMSI.

1.3.3 Facility Turnover Meeting

Include eOMSI in NAVFAC Red Zone (NRZ) facility turnover meetings as specified in Section 01 31 19.05 20 CONCEPT DESIGN WORKSHOP (CDW).

1.4 SUBMITTAL SCHEDULING

1.4.1 eOMSI, Progress Submittal

Submit the Progress submittal when construction is approximately 50 percent complete, to the Contracting Officer for approval. Provide eOMSI Manual Files (Bookmarked PDF) and eOMSI 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 eOMSI Manual Coordination Meeting. Field verify a portion of the eOMSI information in accordance with paragraph FIELD VERIFICATION.

1.4.2 eOMSI, Prefinal Submittal

Submit the 100 percent submittal of the eOMSI Prefinal Submittal to the Contracting Officer for approval within 60 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 eOMSI Progress submittal must be corrected prior to the Prefinal submission.

The eOMSI Prefinal Submittal must include eOMSI Manual Files (Bookmarked PDF) and eOMSI Facility Data Workbook (Excel).

1.4.3 eOMSI, Final Submittal

Submit completed eOMSI Manual Files (Bookmarked PDF) and eOMSI 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.

1.5 UNITS OF MEASURE

Provide eOMSI utilizing the units of measure required by the RFP for the facility. Refer to Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES.

1.6 SUBMITTALS

Government approval is required for submittals with a "G" classification. Submittals not having a "G" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-11 Closeout Submittals

eOMSI, Progress Submittal; G

eOMSI, Prefinal Submittal; G

eOMSI, Final Submittal; G

PART 2 PRODUCTS

2.1 eOMSI FILES FORMAT

Format eOMSI manuals and files in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA. Include a complete electronically linked operation and maintenance directory. Provide four electronic copies of the eOMSI Manuals to the Contracting Officer for approval.

Provide eOMSI Facility Data Workbook on compact disks (CD) or data digital versatile disk (DVD) disks in (EXCEL) format. Scan eOMSI Manual Files and eOMSI Facility Data Workbook for viruses, malware, and spyware using a commercially available scanning program that is routinely updated to identify and remove current virus threats.

2.1.1 eOMSI Manual Organization

Organize the eOMSI Manuals into two parts: 1) Product and Drawing Information, and 2) Facility Information. Bookmark the PDF files for easy access to the information.

- a. Bookmark Product and Drawing Information documents in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA.
- b. Bookmark Facility Information to at least one level lower than the major system.

2.1.2 eOMSI Manual CD or DVD Disk Label and Disk Holder or Case

Provide disks in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA.

2.2 eOMSI MANUAL

2.2.1 Product and Drawing Information

Provide an organized record of the facility products, materials, equipment, and testing submittals, and the minimum information necessary to operate the facility. Provide Product and Drawing Information for the systems of the final constructed facility.

2.2.1.1 O&M Data

As a minimum, provide the approved O&M Data, submitted in the technical specification sections, in accordance with paragraph TYPES OF INFORMATION REQUIRED IN O&M DATA PACKAGES in Section 01 78 23 OPERATION AND MAINTENANCE DATA.

2.2.1.2 Record Drawings

Provide an electronic, PDF copy of the Record Drawings, prepared in accordance with FC 1-300-09N and 01 78 00 CLOSEOUT SUBMITTALS. Bookmark drawings using the sheet title and sheet number.

Include Record Drawings as part of the Red-Zone specified in Section 01 30 00 ADMINISTRATIVE REQUIREMENTS.

2.2.1.3 Utility Record Drawings

Using Record Source Drawings, show and document details of the actual installation of the utility systems; annotate and highlight the eOMSI information. Provide Utility Record Drawings in PDF format. Provide the following drawings at a large enough scale to differentiate designated isolation units from surrounding valves and switches.

- a. 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 five-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.
- b. Enlarged Connection and Cutoff Plans - Provide enlarged floor plans that provide information between the five foot utility 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 locations of the main interior 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.

2.2.2 Facility Information

Provide the following in Facility Information:

2.2.2.1 General Facility and System Description

Describe the function of the facility. Detail the overall dimensions of the facility, number of floors, foundation type, expected number of occupants, and facility Category Code. List and generally describe all the facility systems 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.

2.2.2.2 Basis of Design

Include the Basis of Design that shows the basic design scope of work, assumptions and the original intentions of the Designer of Record (DOR). Identify the site utility design goals, objectives, design load limits, assumptions, and system features that are critical to the operation and maintenance of the systems.

2.2.2.3 Floor Plans

Provide uncluttered, legible 11 by 17 inches floor plans. Include room numbers, type or function of spaces, and overall facility dimensions on the floor plans. Do not include items such as construction instructions, references, or frame numbers.

2.2.2.4 Floor Coverings, Wall Surfaces, and Ceiling Surfaces

Provide a table that lists by room number (including hallways and common spaces), the type, and area of finish, manufacturer's product name, identifying number, and color. Include a facility summary of the total area for each type of space and floor, wall, or ceiling finish in the table.

2.2.2.5 Windows

Provide a table that lists by room number (including hallways and common spaces), the type of window, window size, number of each size and type, special features, manufacturer's product name, identifying number, and color. The table must include a facility summary of the total number for each type and size of window.

2.2.2.6 Roofing

Provide the total area of each type of roof surface and system. Provide the name of the roofing product and system; manufacturer's, supplier's, and installer's names, addresses, and phone numbers; manufacturer's product name, identifying number, and color. For each type of roof, provide a recommended inspection, maintenance and repair schedule that details checkpoints, frequencies, and prohibited practices. List roof structural load limits.

2.2.2.7 HVAC Filters

Provide a table that lists the quantity, type, size, and location of each HVAC filter, manufacturer's product name, and identifying number.

2.2.2.8 Plumbing Fixtures

Provide a table that lists by room number, the number and type of plumbing and bathroom plumbing fixtures (for example, sinks, water closets, urinals, showers and drinking fountains).

2.2.2.9 Lighting Fixtures

Provide a table that lists by room number (including hallways and common spaces), the type of lighting fixture, ballast, number of lighting fixtures, type of lamps and number of lamps, and the manufacturer's product name and the identifying number. The table must include a facility summary of the total number of fixtures of each type and number of lamps of each type.

2.2.2.10 Equipment Listing

Provide a table that lists the major equipment shown on the design equipment schedules. Show the item descriptions, locations, model numbers; and the names, addresses, and telephone numbers of the manufacturers, suppliers, contractors, and subcontractors.

2.2.2.11 System Flow Diagrams

Provide a flow diagram indicating system liquid, air or gas flow during normal operations. Integrate the system components into the diagram. A compilation of non-integrated, flow diagrams for the individual system components are not acceptable.

2.2.2.12 Valve List

Provide a list of all valves associated with the system. Show valve type, identification number, function, location and normal operating position.

2.2.2.13 Riser Diagrams

Provide riser diagrams and settings of equipment.

2.3 eOMSI FACILITY DATA WORKBOOK

Download the eOMSI Facility Data Workbook at the following location:

<http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-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 eOMSI Facility Data Workbook information with Contractor and Government personnel. Include the following personnel in this meeting: Contractor's eOMSI Manual and Facility Data Workbook Preparer and Quality Control Manager, 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 eOMSI submittal, and another, no sooner than 14 calendar days after submission of the Prefinal eOMSI submittal. During this meeting, the Government and Contractor will verify that the eOMSI 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

3.2 eOMSI TRAINING

Provide training on eOMSI Manuals and Facility Data Workbook in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA.

-- End of Section --

PART THREE - PROJECT PROGRAM

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Part 3 contains the project description, functional and performance requirements, scope items, and expected quality levels that exceed Part 4. Part 4 identifies design criteria, verification requirements, and performance and quality requirements of products. See "Order of Precedence" paragraph in Part 2 for relationships between all parts of this RFP.

1.0 PROJECT DESCRIPTION

The purpose of this project is to construct a maximum 5,000 square foot, single-story Composite Shop, located in Naval Station Norfolk, Virginia, that is an intermediate level (I-Level) maintenance facility for the CMV-22B aircraft platform. The facility design must account for the largest removable aircraft components anticipated to require maintenance and must be located in close proximity to maintenance hangars and other Fleet Readiness Center (FRC) airframe shops. The Composite Shop will include areas for epoxy storage and mixing, paint storage and mixing, machining and grinding, cleaning and preparation, layup and bonding, a self-contained paint booth, exterior open storage, office space, restrooms and supporting mechanical, electrical and communication spaces.

Site preparation includes demolition and site clearing, grubbing, grading, excavation, and pavement demolition. Paving and site improvements including grading, concrete aprons, pavement, and storm-water drainage.

If contaminated soil is encountered, the Contractor must handle contaminated material in accordance with applicable portions of the most current version of Federal, State, and Local laws, as well as the Contracting Officer and NAVFAC Mid-LANT Environmental directions. The Contractor must implement necessary mitigation measures to protect the works, future site users, the public, and the environment.

Structural system includes load bearing concrete masonry unit walls with steel or concrete roof deck (acting as a diaphragm) supported by steel joists/beams. Foundations must consist of driven piles, supporting grade beams and structural slabs.

Mechanical utilities include domestic water for domestic and process purposes and make-up water for closed loop heating hot water and chilled water systems. Natural gas for heating hot water loop, processing and domestic hot water. Natural gas use must be coordinated with the local supply contract.

Plumbing work for the Composite Shop will include domestic cold and hot system and sanitary waste and vent system. Cold domestic water will be provided for the Paint Spray Booth as indicated, Heating Hot Water hydronic loop system makeup, Chilled water hydronic loop makeup, hose bibbs, faucets and the Paint Spray Booth as indicated. Tempered water to Emergency Showers and Eye wash stations will be provided.

Natural gas will be provided for the domestic hot water heater and heating hot water boiler as well as other natural gas fired equipment as indicated.

Non-breathable compressed air will be provided for the Composite Shop by local air compressor system for the Paint Spray Booth, pneumatic tool drops and other equipment as indicated.

The Composite Shop will be cooled, heated, ventilated and dehumidified as required. 4 pipe fan coil units will be used for cooling and heating. Active dehumidification will be provided as indicated in the Room Requirements by cold coil using the heating coil to prevent over cooling the space.

An air cooled chiller will provide chilled water at 44°F to 4 pipe fan coil units and the Paint Spray Booth HVAC and as indicated. A natural gas fired hot water boiler will provide heating hot water to the fan coil units and the Paint Spray Booth as indicated.

The telecommunications room will be heated and cooled by a dedicated ductless split system heat pump with supplemental electric heat.

Exhaust will be provided for restrooms and shop storage, mixing, and exhaust hoods as required.

Ventilation and makeup air will be provided by a Dedicated Outdoor Air Unit. Special attention will be given to freeze protection for chilled and hot water coils possibly exposed to outdoor ambient temperatures.

All equipment will operate standalone using factory integral controls. A Building Automation System will not be provided. Paint Spray Booth controls will be provided and installed by the Booth supplier/installer.

Electrical utilities include underground connection on primary side through use of concrete encased ductbank into the existing 11.5kV distribution system. Building service will originate at pad mounted transformer sized per NFPA 70 and UFC 3-501-01. Transformer pad size and height and all primary and secondary ductbank, conduits, and conductors shall comply with criteria in UFC-3-550-01 and per NAVFAC Utilities requirements.

All lighting included on project shall be LED. Lighting shall be controlled per UFC 3-530-01. Provide lighting levels as required per UFC 3-530-01.

Fire protection systems will include a wet pipe sprinkler system and addressable fire alarm system in accordance with UFC 3-600-01. Provide complete sprinkler coverage in accordance with NFPA 13 and an addressable fire alarm system in accordance with NFPA 72.

Building shall be designed with local public address system tied back into main office. PA system will be integrated into office telephone to inform shop personnel when an incoming phone call is detected.

Fiber optic backbone cabling shall be provided from utility demarcation point and terminated in enclosure in Electrical & Telecommunications room. Horizontal cabling shall be CAT6.

This project will provide Anti-Terrorism/Force Protection (ATFP) features and comply with ATFP regulations, and physical security mitigation in accordance with DOD Minimum Anti-Terrorism Standards for Buildings. The chapter 3 standards in UFC 4-010-01 apply to any portion of the facility that reaches an inhabited occupancy. The DOR is required to verify whether the building is low occupancy or an inhabited occupancy as the design develops.

Sustainable design principles must be included in the design and construction of the project in accordance with applicable laws and executive orders. At a minimum, the Composite Shop must be designed with *Guiding Principles for Sustainable Federal Buildings* and comply with the Energy Policy Act of 2005 and the Energy Independence and Security Act of 2007. Low Impact Development will be included in the design and construction of this project as appropriate.

Built-in equipment includes a paint booth, 1-ton monorail hoist crane (dual break, end stop, wire, lug trolley, minimum hook height of 12-feet), and shelving. The paint booth will require an independent HVAC ventilation system (control temperature and humidity) and power supply from the remainder of the facility.

Interior finishes shall be simple, durable, and have high cleaning ability. They shall be durable and supportive of the space function. Generally, interior walls shall be painted, flooring shall be a combination of resinous epoxy flooring system and sealed concrete, and ceilings shall be a combination of suspended acoustical tile and painted exposed ceilings.

Special costs include Post Construction Award Services (PCAS), geospatial survey and mapping, and acceptance testing.

Operations and maintenance support information is included in this project.

Facilities will be designed to meet or exceed the useful service life specified in the DoD Unified Facility Criteria (UFC). Facilities will incorporate features that provide the lowest practical life cycle cost solutions satisfying the facility requirements with the goal of maximizing energy efficiency.

-- End of Section --

2.0 PROJECT OBJECTIVES

2.1 Mission Statement

This project is based on requirements for Intermediate Level Maintenance facilities to help further resolve deficiencies for supporting the Navy's CMV-22B aircraft. This project will provide a new 5,000 square foot building for the repair of specific aircraft parts associated with the Navy's CMV-22B aircraft.

2.2 Facility Function

The new Composite Shop is fundamentally a facility designed to provide specific aircraft part repairs and accommodate the associated aircraft repair personnel. The overall facility is divided into two basic zones: Office/Support areas and Repair Shop areas. The Composite Shop will include areas for epoxy storage and mixing, paint storage and mixing, machining and grinding, cleaning and preparation, layup and bonding, exterior open storage, office space, restrooms and supporting mechanical, electrical, and communications spaces. A self-contained Paint Booth (supporting at least 269-inch blade length) and 1-ton monorail crane will be provided to serve the shop areas. The Collateral Equipment List includes a detailed furniture, fixtures, and equipment list.

2.3 Project Specific Priorities

2.3.1 Sustainable Design and Construction

The P-1127U CMV 22B Composite Shop is less than 10,000 GSF and is therefore exempt from tracking and reporting sustainability requirements as indicated in UFC 1-200-02, *High Performance and Sustainable Building Requirements*.

The following sustainable features should still be considered by the DOR; this list is not all-inclusive, and the sustainable considerations must not be limited by the following summarized list:

- Integrated design process.
- Optimized energy performance (i.e. energy efficient products, LED lighting).
- Enhance indoor environmental quality (i.e. moisture control, reduce VOC in materials, and indoor air quality during and after construction).
- Reduce environmental impact of materials (i.e. environmentally preferred products, recycled content, bio-based products, other sustainable products, and waste materials management).

2.3.2 Storm Water Management - Low Impact Development (LID)

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

2.3.3 Energy Efficiency

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

2.3.4 Building Commissioning

Not used.

2.3.5 Accessibility Requirements

Provide barrier-free design in accordance with [UFC 1-200-01](#) , DoD Building Code (*General Building Requirements*).

2.3.6 Antiterrorism Criteria

The chapter 3 standards in UFC 4-010-01 apply to any portion of the facility that reaches an inhabited occupancy. At the writing of this document, the Composite Shop is designated as low occupancy (less than 11 people routinely occupying the space). The DOR is required to verify whether the building is low occupancy or an inhabited occupancy as the design develops.

The Composite Shop will be less than three stories and will not be required to meet the progressive collapse avoidance standards.

The Composite Shop is within a controlled perimeter. The Composite Shop minimum standoff distance is 20 feet from parking, roadways, and trash containers within the controlled perimeter.

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

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

2.3.7 Cybersecurity

Design, acquire and execute all control systems (including systems separate from management utility monitoring and control system) 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.

Incorporate ICS Security Controls located in NIST 800-82, Appendix G, Table G-1. Design the project using UFGS 25 05 11 Cybersecurity of Facility-Related Control Systems. Incorporate elements of the NAVFAC Cybersecurity Hygiene Checklist into contract specifications by using SECTION 25 05 11, CYBERSECURITY OF FACILITY-RELATED CONTROL SYSTEMS. CIO4 Point of Contact to be utilized in SECTION 25 05 11 is Richard Zamora (richard.m.zamora@navy.mil; 757-341-0025). Submit Cybersecurity Plan and Cybersecurity Hygiene Report in accordance with SECTION 25 05 11.

At a minimum, the following specification sections will be included in the project specification; SECTION 25 05 11, CYBERSECURITY OF FACILITY-RELATED CONTROL SYSTEMS; SECTION 25 08 10, UTILITY MONITORING AND CONTROL SYSTEM TESTING, SECTION 25 08 11.00 20, RISK

MANAGEMENT FRAMEWORK FOR FACILITY RELATED CONTROL SYSTEMS, AND SECTION 25 10 10, UTILITY MONITORING AND CONTROL SYSTEM (UMCS) FRONT END AND INTEGRATION.

Contractor will be responsible for acquiring all certifications of all required systems including the appropriate authority to operate. The Facility-Related Control System's corresponding impact rating categorization (Confidentiality-Integrity-Availability) shall be LOW-LOW-MODERATE.

Incorporate cybersecurity requirements into project facility control systems identified in:

ESR B20, EXTERIOR ENCLOSURE.

ESR D10, CONVEYING.

ESR D30, HVAC.

ESR D50, ELECTRICAL.

2.3.8 Secured Areas

Not used.

2.4 Appropriate Design

The Government is interested in a best value proposal that supports the functional needs of the user and activity. The levels of quality and durability specified must be responsive to the function, mission effectiveness, and cost effectiveness of a high use military facility expected to provide many years of service. Interior finishes must be extremely durable, sustainable, and be supportive of buildings designed for enlisted military personnel. Low-maintenance is of primary importance. Provide interior materials and finishes as identified in the Room Requirement Charts and the Performance Technical Specifications of the RFP.

The overall building design was driven by 5 major factors: 1) the existing site location and adjacent conditions, 2) the desire for a "clear span" building structural system and framing design, 3) local environmental conditions, 4) the design intention to be compatible with existing construction and new planned facilities, and 5) the need to fulfill the Government's program.

The proposed floor plan: 1) reflects the required functional space relationships, with room locations based on dialogue with Government representatives, 2) responds to program requirements, 3) provides for logical utilization and work flow zoning of the building, and 4) and aesthetically responds and relates to the design language of the adjacent buildings on site.

The overall facility is divided into two basic zones: Office/Support areas and Repair Shop areas.

The Repair Shop areas include: a) Machining/Grinding, b) Clean/Prep, c) Layup/Bonding, d) Paint Booth Room, and the associated support spaces (Paint Storage & Mixing and Epoxy Storage & Mixing). The Repair Shop areas are served by a 1-ton monorail hoist crane system with a minimum hoist hook height of 9 ft.

The Office and Support areas include: a) Office, b) Electrical/Telecommunications, c) 2 Unisex restrooms, d) and a Janitor's closet. These rooms have low occupancy.

Construction methods may vary subject to compliance with the RFP criteria and design requirements.

2.5 Workflow Process

2.5.1 Hours of Operation

Building will be occupied during “normal” station operation hours.

2.5.2 Staffing/Occupancy

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

2.6 Special Design Challenges

2.6.1 Crane

This project includes a 1-ton monorail hoist crane that will be used to facilitate the movement of parts through the Repair Shop areas for servicing. Special consideration will be required to provide sufficient clearances for the crane track support structure at the beginning and end of the crane run in order to avoid conflicts with existing infrastructure or site traffic flow. In addition, the Contractor will be required to ensure that the crane hoist has the necessary clearances to move through the track from room to room within the building itself.

2.6.2 Site Flow

A site analysis is required to study how site placement of the building will affect vehicle traffic to, from, and around the building in order to ensure existing site operations are not compromised or negatively affected by the construction of the new facility.

2.6.3 Paint Booth

Due to space constraints, consideration should be given to the paint booth placement within the Paint Booth Room in order to ensure proper circulation around the paint booth and entry access to the paint booth itself. In addition, the paint booth will require clearances for associated mechanical equipment that need to be taken into account when determining ceiling heights and structure for that room and the building.

2.6.4 Utilities

Proposed utility connection locations for water, sanitary sewer, storm sewer, compressed air, power, and telecommunications have been included in the Part 6 attachments.

2.7 Adaptability and Flexibility

To the greatest practical extent, provide for the following:

1. Design buildings to avoid relying upon interior load-bearing walls, permitting future relocation of interior walls. Design buildings to maximize above-ceiling access and identification of above-ceiling systems for ease of service and maintenance.
2. Provide building materials and colors from readily-available stock. Avoid use of difficult-to-find or difficult-to-supply materials and components.

3. Utilize technology as specified under this RFP, and prepare spaces to adapt to future technology as required under this RFP. Particular attention is directed to convenient placement of pull boxes for servicing and future alteration of electrical and communications/data systems.
4. As building construction nears completion, the Design-Build Contractor must be prepared to coordinate with the activities of Government personnel in order to facilitate occupancy and installation of equipment and systems. The Government must make every effort to coordinate work with the Design-Build Contractor; however cooperation by the Design-Build Contractor is expected.

-- End of Section --

3.0 SITE ANALYSIS

3.1 Existing Site Conditions

3.1.1 Site Location

Refer to Part 6 for the Site Location Map.

The project site is located within the Fleet Readiness Center (FRC) compound at the southeast corner of the SP Area Ramp, Naval Station Norfolk. The site consists of a POV Parking lot and SP302 (Tire Storage Building) located in the northwest corner. The site is bounded to the north by the SP Area Ramp, to the east by a gated asphalt access drive and grass median strip, to the south by a grass median, and to the west by the SP296 Wash Rack. The main FRC Facility Building SP300 is located opposite the eastern access drive aisle.

3.1.2 Existing Surface Conditions

Refer to Part 6 for the Existing Conditions Plan.

The project site area is 225'±x155'± and mostly covered with an asphalt surface. A 25'±x50'± reinforced concrete pad is located along the west edge of the of the project area. Concrete stoops are located in front of the garage and doorway openings of SP302. The parking area pavement system is assumed to be 2" bituminous concrete surface course, 3" bituminous concrete base course, over 8" dense graded aggregate. The reinforced concrete pad is assumed to be 8" thick with 8" edges turned down 18" from top of pad. The grass medians are bordered with standard concrete curb and gutter. The grass median bordering the access drive entrance includes a 24" pine tree.

A 7' high chain link fence with 1' top guard secures both the FRC compound and the SP Area Apron. The fence line runs along the north, west, and south sides of the project site. Multiple bollards are located on the south side of SP302 to protect various above-grade utility features, such as the fire hydrant, post indicator valve (PIV), and wall mounted gas meter.

3.1.3 Existing Drainage

The existing site is relatively flat, with slopes ranging from 1.25% to 2.67%. Runoff sheet-flows from the lot periphery and is collected via the drop inlets located in the south and center drive aisles of the parking lot. The storm main is routed across the lot and conveys collected stormwater runoff eastward for 625', then ties into the drainage system that runs northward and ultimately outfalls into Willoughby Bay.

3.1.4 Existing Site Utilities

Fire protection for the FRC Compound is provided by a 12" DIP submain that runs along the east edge of the site and continues within the corridor between the SP Area Ramp and SP300. An 8" DIP fire service line branches off of this submain and serves a fire hydrant and SP302. The building connection that serves SP302 is equipped with a post indicator valve assembly.

An 8" DIP domestic water main runs along the south edge of the site. A 4" DIP domestic water service line for the FRC Compound branches off of this main at the southeast corner of the parking lot. Immediately after the tee is a 6"Wx10'LX6.5'H water meter vault. SP302 does not have a domestic water connection.

Two existing underground electric ductbanks (4-way and 6-way) and one communications ductbank cross the site along the southern edge, running parallel to the domestic watermain. A separate electric ductbank crosses the site along the eastern edge of the parking lot, feeding power to Building SP300. From the electrical room of SP300, an underground electrical conduit runs west to service SP302. A lighting conduit also runs from the corridor between the SP Area Ramp and SP300 to feed the two light poles located along the western edge of the parking lot. This lighting conduit continues south to feed light poles in the parking adjacent to "A" Street. Assume concrete envelope of ductbanks have 30" cover and are 2'H X 2'W for 4-way and 3'H X 2'W for 6-way.

A 10" gravity sanitary sewer main is located south of the site, on the unsecured side of the fenceline. This main receives sewage flow from facilities along "A" Street, with the FRC compound, SP 29, and SP384 located at the upstream end of the main. Sewage flow is conveyed to the SP368 Lift Station and pumped downstream into a gravity structure at the intersection of Tow Way and Bellinger Blvd. Within the FRC compound, the sewage load is delivered to a pump station to the east of the O2N2 Shop before it is conveyed to the sanitary sewer main. The Tire Storage Building SP302 does not have a sewage load; therefore, no sewer system components are located within the project site limits.

3.1.5 Abandoned Infrastructure

The site may contain buried infrastructure that has been abandoned in place, including a 550 gallon wash water storage tank, oil separator, catch basin, piping, and railroad tracks. As determined according to records, the abandoned tracks run parallel to "A" Street in the vicinity of the existing electric and communications ductbank.

3.1.6 Existing Geologic and Geotechnical Site Conditions

The site is located in Virginia's Atlantic Coastal Plain physiographic province. The Coastal Plain is characterized by an eastward thickening wedge of marine, estuarine, and fluvial sediments that were deposited in a series of marine transgressive-regressive cycles, or high and low stands of sea level. This Coastal Plain soils general consist of interbedded sands and clays.

Review of the Geology of Norfolk North Quadrangle Map, Publication 8 shows that the site is located on natural land underlain by the Sandbridge Formation, which consists of estuarine-beach fine to coarse sand, see Figure 1 below.

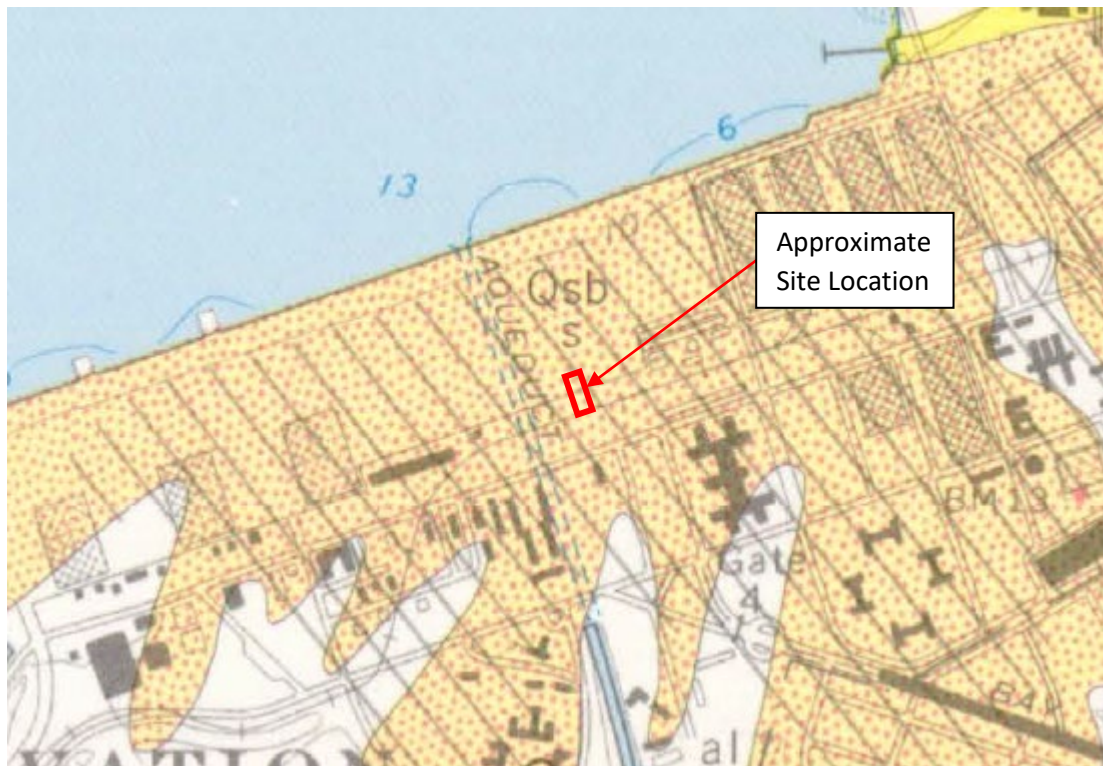


Figure 1: Geology of Norfolk North Quadrangle Map, Publication 8

Review of available base environmental information and the Virginia DEQ Environmental Data Mapper indicate there is no known or reported contamination within the site. However, the area was developed before environmental documentation began.

Review of historical aerial photos from 1963 to present indicates that the site was previously developed with airfield apron pavement and wash rack. Review of available base planning information indicates that two structures were demolished within the site area. The extent of foundation demolition and removal is unknown.

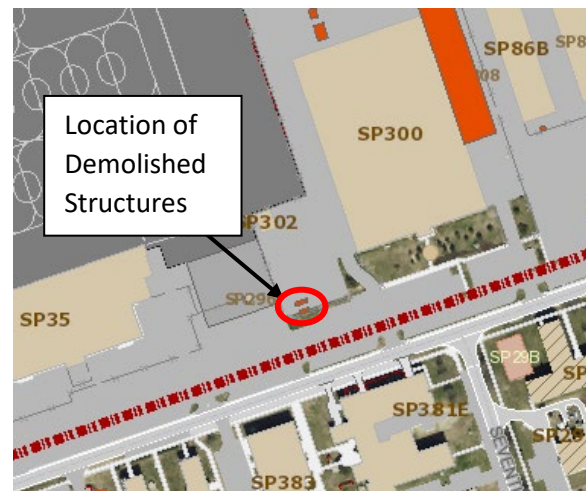


Figure 2: NAVFAC GRX CNR Mid-Atlantic Planning App

3.1.7 Geotechnical Information and Requirements

EXISTING GEOTECHNICAL DATA

Subsurface soil information is included in Part 6 of this RFP (refer to Part 6 - Attachments).

The soils information provided in this RFP is for reference only, and reflects the soil conditions encountered only at the locations indicated. The Government shall not be responsible for any interpretation or conclusion by the Contractor drawn from the data or information beyond the industry standard of care. Any geotechnical report accompanying the subsurface information is provided only to better convey data (boring logs, testing, etc.) or to document observed site conditions. The assumptions, analysis, and recommendations provided in any accompanying report are based on preliminary planning requirements and may not be applicable to the offeror's design concept as the current project requirements, and assumptions may differ.

Groundwater level measurements are noted on the boring logs. The Contractor, in conjunction with their geotechnical engineer, is responsible for interpreting the available groundwater information and determining potential impacts related to design and construction of the design concept. The Contractor shall anticipate seasonal perched water table conditions at or near (i.e. ± 3 feet) the existing ground surface and incorporate measures into their design and construction procedures to address these conditions.

GEOTECHNICAL ENGINEERING CONSULTATION AND STUDY

The Contractor will retain a Geotechnical Engineer experienced in the geologic region and currently licensed in the state where the project is located to interpret the Government provided information as related to their design concept/bid and develop geotechnical requirements to support design and construction for the project meeting the requirements of this Proposal for bidding purposes.

After award, the Contractor's Geotechnical Engineer (aka Geotechnical Engineer of Record) must perform a site specific geotechnical study including supplemental soil borings, in-situ testing, and laboratory analysis of representative soil samples, and prepare a Geotechnical Report providing recommendations for foundation and pavement design in accordance with UFC 3-220-01 *GEOTECHNICAL ENGINEERING* and FC 1-300-09N *NAVY AND MARINE CORPS DESIGN PROCEDURES* and associated references. Calculations will be provided in the report to support all conclusions and recommendations.

The site specific investigation should include DGM survey to locate and identify extents of abandoned infrastructure mentioned in section 3.1.5.

Following submittal and Government approval of the Geotechnical Report, the Geotechnical Engineer of Record will prepare a letter for each design submittal verifying in writing that the recommendations of the Geotechnical Report have been properly incorporated in the plans and specifications and that the project information referenced in the Geotechnical Report is still valid based on the current project design. The letter prepared by the Geotechnical Engineer of Record will be included in the Basis of Design for each design submittal.

3.2 Site Development Requirements

3.2.1 Site Demolition

Demolish asphalt pavements (full depth including base) within the project site. Sawcut pavement so that edges are straight and corners are squared.

Demolish concrete pad.

Demolish offsite pavement and concrete hardscapes (e.g. curb and gutter, sidewalks, etc.) as needed to facilitate utility work, grading, and drainage. Remove concrete hardscapes to the nearest joint.

To avoid existing storm drains crossing proposed building footprint, disconnect and demolish conflicting storm drain structures and piping that will be replaced/rerouted.

To maintain fire hydrant access with erection of new building, disconnect and demolish fire hydrant and associated waterline piping and valve that will be replaced/relocated.

Demolish bollards protecting existing fire hydrant to be relocated.

Remove existing chain link fence fabric and associated fence components as necessary to facilitate site improvements. Provide temporary security fencing as needed to protect the FRC Compound and SP Area Apron from unauthorized entry. Match height of existing fence.

Remove pine tree only if necessary to facilitate utility work. Otherwise, provide tree protection and/or preservation.

Refer to Electrical Section for demolition of light poles and lighting circuit.

For bidding purposes, assume the following abandoned items will be encountered and require removal to facilitate new building construction and related site improvements:

- 150 LF abandoned railroad tracks
- 100 LF pipe up to 8" nominal diameter
- 550 gallon underground wash water storage tank
- 5 CY concrete remnants from abandoned structures such as buried drain inlets, oil separators, and concrete swales.

Remove abandoned storage tank and oil separator in accordance with Federal, State, and Local regulatory requirements.

Removal of abandoned debris includes backfilling excavations with compacted select fill material.

3.2.2 Site Improvements

Refer to Part 6 for Conceptual Site Plan.

Site and orient proposed Composite Shop building as shown in the Conceptual Site Plan to meet spacing requirements for fire separation (refer to Fire Protection Criteria), physical security setbacks (refer Antiterrorism Criteria), and functional efficiency for the composite shop operation. To the maximum extent practicable, maintain 10 feet between building foundation and utilities, except for building connections.

Provide earthwork to include excavation and fill, grading, utility trenching, dewatering and backfill. Provide backfill to replace voids remaining after removal of abandoned structures. Refer to Section 3.2.4.2 Geotechnical Earthwork and Site Preparation Requirements for backfill requirements.

Grade site to promote positive drainage.

Provide heavy duty asphalt paving throughout the project site. Provide 5-foot wide concrete pads abutting the long sides of the building, intended for open storage of various sized blade box containers up to 25-feet long.

Provide portland cement concrete for garage and doorway stoops and aprons.

Provide replacement concrete hardscapes (e.g. curb and gutter, sidewalks, etc.) disturbed by offsite utility installation. Also provide new hardscapes as needed to delineate vehicular, equipment, and/or pedestrian circulation.

Establish safe and efficient vehicular, equipment, and pedestrian site circulation. Provide paint markings and post-mounted sign panels as required for visual aid or traffic control. Site will mainly be limited to forklift movements and equipment laydown areas, except for emergency vehicles. Forklifts may carry loads up to 25-foot long blade box container. Personal Occupancy Vehicles (POVs) will be restricted from the Composite Shop site, while the remainder of the compound accommodates vehicles ranging from POVs to emergency vehicles.

Install storm drain piping and structures to collect stormwater runoff and reconnect drainage system to the existing upstream and downstream system.

Relocate and provide fire hydrant and associated service line and valve to meet the requirements of fire protection/fire department.

Provide domestic water service for the Composite Shop and, unless otherwise directed, connect to 4" DIP domestic water service line downstream of the water meter vault so that the water usage is included with the FRC compound's domestic distribution. Verify that the existing meter and connecting watermain are sufficiently sized for proposed water usage. Make improvements up to the water main as needed.

Provide sanitary lateral and conveyance from the Composite Shop to the existing sanitary sewer main. Where gravity flows to the existing main are not feasible, provide a complete packaged sewage pump station and discharge forcemain.

Establish vegetative cover for grassed median areas that are either disturbed due to construction activities or enlarged to provide Environmental Site Design (i.e. impervious surface reduction).

For unavoidable loss of the existing pine tree, provide replacement trees for every 6" increment in dbh (diameter breast height) of the tree to be removed, with the replacement ratio to be rounded upwards to the next increment. Otherwise, protect tree to remain in place. Preserve or replace tree(s) in accordance with the COMNAVREGMIDLANT INSTRUCTION.

Refer to Electrical Section for site lighting.

Refer to Electrical Section for installation of new transformer and underground electrical distribution.

Refer to Structural Section for installation of new equipment pads.

Provide bollards to protect new above ground utility structures from vehicular traffic.

Establish design flood elevations for critical components, such as building foundation and pad-mounted electrical transformers, in accordance with UFC 3-201-01 and coordinate with appropriate disciplines.

Provide temporary erosion and sediment control measures as required by the Virginia Erosion and Sediment Control Laws and Regulations.

Apply site improvements as needed to meet the stormwater management (SWM) technical criteria of the Virginia Stormwater Management Act. Incorporate Environmental Site Design (ESD), such as impervious surface reduction, or Best Management Practices (BMPs) to mitigate the impacts of redevelopment in

accordance with the Virginia Stormwater Management Program (VSMP) Regulation. If SWM practices must be used, select those that require simple maintenance routines (i.e. avoid media replacement, winterization, cleaning with vacuum truck, etc.).

Provide Maintenance of Traffic during construction. Maintain at least one lane of traffic along local roadways at all times.

Replace chain link fence and top guard disturbed by construction activities with new materials to maintain physical security for FRC facilities and abutting airfield. Where fence line separates the SP Area Apron and the FRC compound, the outriggers shall face the FRC Compound.

3.2.3 Anti-Terrorism Force Protection

The primary objective for antiterrorism/force protection (ATFP) design is to protect the mission and occupants of the Composite Shop located within the NSN installation perimeter. To meet this objective, physical security protective design must be developed in accordance with all applicable standards of UFC 4-010-01 DoD Minimum Antiterrorism Standards for Buildings. The chapter 3 standards in UFC 4-010-01 apply to any portion of the facility that reaches an inhabited occupancy. At the writing of this document, the Composite Shop is classified as low occupancy (less than 11 people routinely occupying the space). The DOR is required to verify whether the building is low occupancy or an inhabited occupancy as the design develops.

3.2.4 Geotechnical Earthwork and Site Preparation Requirements

3.2.4.1 Criteria for Bidding

Base bids on the following criteria:

- Depth of buried demolition debris and/or uncontrolled fill materials is up to 6 feet below existing grades;
- Normal water table depth range is 6 to 9 feet below current ground surface;
- Seasonal high water table depth range is 3 to 6 feet below current ground surface;
- Excavated onsite soils are unsuitable for reuse as backfill and fill in structure and pavement areas and may only be reused as common fill- imported structural fill and backfill must be used in all structure and pavement areas and for utility and foundation excavation backfill;
- Temporary surface/subsurface drainage is required for dewatering during construction and permanent subsurface drainage systems is required in planned pavement areas;
- A 12 inch thick layer of select material subbase and woven stabilization geotextile will be provided beneath all new vehicular pavement areas;
- The building and slab will be supported on deep foundations;
- All underslab utility lines will be structurally supported on stainless steel hangers;
- A preconstruction condition survey for structures located within a 200 foot radius of the project site and ground vibration monitoring program is required for driven pile foundations;
- Sheet piling, shoring and well point dewatering will be required for foundation and utility excavations that extend below the groundwater level.

3.2.4.2 Geotechnical Earthwork and Site Preparation Requirements

Prepare the site in accordance with the project specifications, best practices, and the local industry standard of care. The Contractor's Geotechnical Engineer shall monitor site stripping operations on a full time basis. Stripped surficial soil materials will be properly disposed of as specified and imported topsoil will be provided for the project where needed.

Construction traffic will not travel directly on exposed subgrades. The Contractor will construct haul roads as necessary to facilitate construction traffic access across the site and protect the underlying subgrade from deterioration. The Contractor will be responsible for the cost associated with any necessary measures to repair subgrades deteriorated from exposure to construction traffic and/or standing water.

Control of groundwater and surface water encountered during construction is the responsibility of the Contractor. The Contractor will provide temporary dewatering and positive site drainage as needed to prevent conditions that will promote deterioration of exposed subgrades and open excavations, and prevent interruptions to the progress of construction. The Contractor will construct, install, and maintain all necessary temporary water containment facilities, channels/ditches, and diversions for groundwater and surface water control during the course of construction including all necessary temporary environmental controls.

The site contains existing structures, surface pavements, and above and below ground utilities that will require demolition and removal prior to earthwork operations. It is noted that the required removal depth of the existing site features should be expected to be highly varying. Also, it is noted that structures and roadways were formerly located within the limits of the project site. As a result, the Contractor will anticipate that pile cap and any individual pile locations will be pre-excavated up to a depth of 6 feet below the existing ground surface with a backhoe/excavator to remove possible demolition debris, abandoned concrete foundations, or abandoned utility pipe lines or utility structures (i.e. manholes, catch basins, vaults, etc.) to facilitate pile pre-augering and pile installation. These pre-excavated areas will be backfilled with imported structural fill prior to pre-augering the pile locations.

The use of imported structural fill materials will be required to backfill excavations resulting from the demolition of existing utilities/foundations as well as new utility/ foundation excavations within the planned building and pavement areas, and for fill in pavement and building areas. Imported structural fill material shall meet the requirements for VDOT Select Material Type III or better. Excavated on-site soils may only be reused as common fill beyond the limits of surface bearing structures (i.e. pavements, buildings, etc.) provided it meets the project requirements. All soil material shall exhibit the characteristics required to compact the soil to the density and performance specified for the intended locations. Excavated on-site soils will be amended (i.e. with lime, cement, or blended with imported structural materials, etc.) as necessary to facilitate reuse as common fill. All fill and backfill materials will be moisture conditioned prior placement and compaction to within ± 2 percent of the optimum moisture content as defined by ASTM D 698.

Satisfactory Materials are any materials classified by ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, SM, [SP-SM free of debris, roots, wood, scrap material, vegetation, refuse, soft unsound particles, and frozen, deleterious, or objectionable materials. The maximum percentage passing the No. 200 sieve shall be limited to 20 and a maximum liquid limit of 25 and a maximum plasticity index of 6 by ASTM D4318. Unless specified otherwise, the maximum particle diameter shall be 3 inches. All fill and backfill material will be moisture conditioned prior to placement and compaction to within ± 2 percent of the optimum moisture content as defined by ASTM D 1557 or ASTM D 698.

Unsatisfactory Materials are any materials which do not comply with the requirements for satisfactory materials. Unsatisfactory materials also include man-made fills, trash, refuse, or backfills from previous construction. Unsatisfactory material also includes material classified as satisfactory which contains root and other organic matter, frozen material, and stones larger than 6 inches. The Contracting Officer shall be notified of any contaminated materials.

The Contractor will be responsible for maintaining erosion control measures, preventing segregation, and moisture conditioning for any excavated onsite soil and aggregate materials and any imported soil and aggregate materials stockpile onsite.

All excavated materials which cannot be reused on the project as common fill (surplus soils) must be managed in accordance with Specification 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS in Part 2 of this RFP. No surplus material will leave Government property without written approval of the installation Environmental Program Manager and the Contracting Officer. The Contractor is responsible for all costs associated with the management and disposal of surplus excavation spoils.

All surplus excavation spoils must be disposed of at a permitted and licensed RCRA Subtitle D disposal facility.

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 proofrolling of the pavement and building pad 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 building pad 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.

--End of Section--

4.0 BUILDING REQUIREMENTS

4.1 Facility Requirements

Facility requirements for CMV 22B Composite Shop building are described herein to provide the intended facility gross area (in square feet), building code classifications for occupancy and intended minimum construction type, importance factors, occupancy loads (where applicable), height requirements, and a general description of building systems, using the Work Breakdown Structure (WBS) format.

Requirements indicated on the Facility Requirement sheets will be coordinated with other aspects and more detailed specifications elsewhere in this RFP.

The Design-Build Contractor must establish Anti-Terrorism classifications for each facility based on its use and occupant load, in accordance with UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*.

4.1.1 Facility Requirements – CMV 22B Composite Shop

BUILDING ID#	TBD
BUILDING NAME	CMV 22B Composite Shop
Gross Area:	5,000 SF
Number of Floors:	1
Occupancy Classification(s):	F1 (IBC) / Industrial (NFPA)
Occupant Loading:	Per NFPA 101 Life Safety Code
Construction Type:	IIB
Building Height Requirement(s):	Refer to Space Tabulations 4.2 for ceiling clear height requirements.
Sustainable Design:	Yes, per UFC 1-200-02
Mission Essential:	Yes, per UFC 3-600-01
Description of Construction:	
A10.....Substructure:	Deep foundation system, shallow spread footings, or special foundations. Slab-on-grade or structurally supported slab. If design-build contractors geotechnical and structural engineering team determine a structural slab is required, utilities must be supported as stated in A1040.
A20.....Basement Construction:	Not Used.
B10.....Superstructure:	Conventional steel framed structure or load bearing concrete masonry structure.
B20.....Exterior Closure:	Brick veneer and insulated metal panel cladding with concrete masonry wall backup construction.
B30.....Roofing:	1/2" : 12" (minimum slope) standing seam metal roof for steep slope roofs or modified bitumen for low sloped roofs, scupper, gutters and downspouts to storm water drainage system.
C10.....Interior Construction:	Metal studs with gypsum board and acoustic insulation, and / or concrete masonry units with metal furring and gypsum board, and concrete masonry units painted.

C20.....Stairs:	Provide metal ladders to access rooftop mounted mechanical equipment.
C30.....Interior Finishes:	Sealed concrete floors; painted walls & gypsum board ceiling; suspended acoustic ceilings.
D10.....Conveying System:	Provide 1-ton capacity monorail crane and hoist.
D20.....Plumbing:	Provide a natural gas fired hot water heater to supply cold and hot domestic water to fixtures and systems. Provide natural gas to water heating equipment. Provide compressed air for pneumatic tools.
D30.....HVAC:	Provide 4 pipe fan coil units and controls for space heating and cooling. Provide dedicated outdoor air unit for ventilation. Provide exhaust as required in restrooms and shop exhaust systems. Provide an air cooled chiller to supply 44 degree chilled water. Provide a natural gas fired boiler for heating hot water.
D40.....Fire Protection System:	Fully sprinklered with emergency/voice fire alarm system.
D50.Electrical Power & Lighting:	480/277V power required for 208Y/120V power required for general receptacles and dedicated workstation receptacles. LED lighting throughout the space.
E10.....Equipment:	Government furnished equipment installed by Contractor. Specialty Equipment provided under contract including, but not limited, to self-contained paint booth.
E20.....Furnishings:	Provide design to incorporate all FF&E as needed to support facility functions. Refer to Part 3, E20
F10.....Special Construction:	Not Used.
F20.....Demolition:	Not Used.
G10.....Site Preparations:	Site clearing, site demolition, and site earthwork.
G20.....Site Improvements:	Full depth asphalt paving, asphalt milling and overlay, concrete hardscapes, security fence, bollards, and grass establishment.
G30.Site Civil/Mechanical Utilities:	Domestic water service line, fire protection water service line, fire hydrant, sanitary sewer gravity lateral, package lift station and discharge force main, storm drainage piping and structures, and natural gas service line.
G40.....Site Electrical Utilities:	Provide underground service feeder from manhole SP44 nearby building SP-300.
H10.....Waterfront Structures:	Not Used.
H20.....Graving Drydocks:	Not Used.
H30.....Coastal Protection:	Not Used.
H40.Navigation Dredging and Reclamation:	Not Used.

H50.....Waterfront Utilities: **Not Used.**

H60.....Waterfront Demolition: **Not Used.**

H70.....Waterfront ATFP: **Not Used.**

4.2 Space Tabulation

Space requirements for the CMV 22B Composite Shop building are summarized in the Space Tabulation summaries on the following pages. Area calculations are based on allowances for personnel, equipment, conferencing and ancillary space needs. Regardless of the new square footages listed in the Space Tabulation document, total gross square footage must not exceed the amounts listed for this facility.

The Design Build Contractor must not design or build less than the aforementioned area for the CMV 22B Composite Shop building.

Space Tabulations Notes:

1. "Covered Outdoor Areas" refer to outdoor areas beneath roof. Overhang roof eaves are excluded from calculating covered areas.
2. Building gross areas must be calculated in accordance with UFC 3-101-01, "*Architecture*," Chapter 4, Paragraph **4-2.2 Calculations of Gross Building Area**, found at the following website: https://www.wbdg.org/FFC/DOD/UFC/ufc_3_101_01_2020_c1.pdf

Actual gross area limits must be measured to exterior face of walls or glazing, whichever is the predominant exterior wall surface. Exterior areas must be counted at one-half their actual net area; i.e., a covered entrance porch of 250 actual square feet must be counted as 125 square feet.

3. It is a requirement of this contractor to build no less than the total building area indicated herein.
4. Except as indicated otherwise, occupant figures shown are based on average actual occupancy anticipated for the facility. Occupant loads for purpose of building code compliance (e.g., determining egress requirements) must be calculated for each facility in accordance with NFPA 101 and other applicable criteria.
5. The Space Tabulation Sheets are sub-divided into smaller "use-groups". Those groupings of spaces are assumed to need adjacency within the group as part of the larger arrangement of spaces in the building.

CMV 22B Composite Shop Building

SPACE NAME	NET USABLE AREA (SF)	MINIMUM CLEAR CEILING HEIGHT (FT)	NUMBER OF OCCUPANTS	QUANTITY OF WORKSTATIONS	ROOM REQUIREMENTS PAGE NO.	REMARKS
CMV 22B Composite Shop Building						
Office / Support Areas						
Office	96	9'-0"	1	1	1	
Elec / Tele	111	-	-	-	3	Note 1
Mech	155	-	-	-	5	Note 1
Unisex	64	9'-0"	-	-	7	
Unisex	64	9'-0"	-	-	9	
Janitor	40	9'-0"			11	
Epoxy Storage and Mixing	199	-	2	-	13	Note 1
Paint Storage and Mixing	202	-	2	-	15	Note 1
Corr	553	9'-0"	-	-	17	
Repair Shop Areas						
Machining / Grinding	538	-	4	-	19	Note 1
Clean / Prep	177	-	4	-	22	Note 1
Layup / Bonding	238	-	4	-	24	Note 1
Paint Booth Room	48	-	2	-	26	Note 1
Notes						
1. Omit finish ceiling this space. Space shall extend to exposed structure above.						
Subtotal Net Area	4,369					
Net to Gross Factor	1.144					
Total Gross Area	5,000					

4.3 Space Relationships

Room adjacencies are indicated in 5.0 - Room Requirements. During preparation of this RFP, the Activity was consulted regarding preferences for organizational adjacencies; and to the greatest practical extent, the preferences are reflected in the Room Requirements sheets. The Design-Build Contractor is nonetheless obligated to verify the Activities program and adjacency requirements during the Contractor Design Workshops (CDWs).

4.4 Exterior Character

The Design-Build Contractor and its Architect-Engineer must be responsible for determining all facilities exterior design. The facility must be designed to give a homogeneous appearance to all buildings in the area. An attention to human scale must be at the forefront of the design. Building heights must be established from the building's functional requirements, to fit interior ceiling heights plus required overhead clearance to structure, and other factors, as stated in other areas of this RFP. Additional height, if required, shall be provided to ensure adequate clear interior height above finish ceilings for overhead ductwork, sprinklers, conduit, overhead clearances above rolling service doors, roof structure, and other building systems.

The design must conform to the most current edition of the Norfolk Naval Station Exterior Installation Appearance Plan (IAP).

In addition to the IAP requirements, adhere to the following design principles to achieve the intent for the exterior appearance:

1. Attention to human scale.
2. Use of architectural details, materiality, and finish color schemes consistent with the IAP.

The following features are prohibited:

1. Long, unbroken wall panels without planar relief.
2. Dead flat roofs and false mansard type roofs.
3. Visible roof-mounted or unscreened equipment.
4. Mechanical equipment enclosures such as meter closets which appeared "tacked-on" to the building.
5. Windows and doors without trim or recess. Window and door openings flush with building façade.

Exterior materials and finishes must be durable and require minimal maintenance. The building must project a professional appearance, clean and uncluttered. The exterior wall materials will be selected based on corrosion and UV resistance. Design for humid and marine/ corrosive climates.

Building maintenance and durability are primary concerns. Material selection must be mindful of both factors in order to product long-lasting, low maintenance facilities.

Exterior windows must be designed to meet minimum AFTP blast resistance and comply with IBC 2018 requirements to resist hurricane windborne debris. All exterior glazing must consist of insulating glass with an inboard lite of laminated glass to meet "large missile" debris resistance below 25 feet in height, and "small missile" resistance for areas above 25 feet. Glazed exterior doors may consist of a single (non-insulated) lite of laminated glass. Windows and doors opening flush with the building façade and without trim or recess are prohibited.

Provide sloped roofs as specified in the Facility Requirements.

All roofs must drain to building perimeters and stormwater must be collected and conveyed through scuppers into conductor heads and downspouts.

Exterior lighting generally increases personal safety, enhances appearance, and provide a sense of orientation and security. Provide appropriate lighting for the functional aspects of the project that are compatible with the installation and architectural design of the planned facility.

The CMV 22B Composite Shop building exterior wall system must match the existing brick veneer and insulated metal panel cladding with concrete masonry wall back-up construction of SP-300.

4.5 Interior Character

The Design-Build Contractor and its Architect-Engineer shall be responsible for determining the facility's interior design. For the entire complex emphasis shall be placed on openness of the facility functions to greatest practical extent while maintaining acoustical and environmental separations as needed. Additional emphasis shall be placed on daylighting and efficiency of circulation.

The interior design shall avoid trendy colors and patterns and place more emphasis on durability, ease of maintenance, and timelessness of design. The use of low maintenance natural material finishes such as ground face CMU is encouraged. Where private offices are painted, one wall shall be painted as an accent wall of a second color to be selected by the Contractor's designer and approved by the base with the finishes package. When CMU is the primary wall construction material, provide rounded corner (bullnosed) CMU at all corners.

When corridors are longer than eighty feet, provide visual breaks to avoid "tunnel" effects such as (but not limited to) variations in corridor width. Maintain minimum widths as required by other portions of the RFP. Variation of ceiling height and ceiling material in corridors in non-utility facilities is encouraged. Other interior enhancements such as change of color/material at floors/walls, dropped soffits and/or pilasters to give definition and character to the corridor as well as divide functions that feed into the corridor and recessed lighting is encouraged.

The Design Build Contractor must provide a comprehensive design based on requirements stated in this RFP. Refer to Part 3 Chapter 5: Room Requirements for additional information regarding finishes for the complex's facilities. The Project must conform to current codes, applicable UFC's, and NAVFAC and CMV 22B regulations. The Design Build Contractor's architect / engineer assumes sole responsibility for the final design of the project facilities.

4.6 Interior Systems

The Design-Build Contractor and its Architect-Engineer are responsible for selection and design of interior mechanical HVAC systems and electrical power, lighting, telecommunications, and fire protection systems in accordance with design guidance, criteria and requirements herein. The Design-Build Contractor must select and provide system based on their durability, energy efficiency and maintainability.

-- End of Section --

5.0 ROOM REQUIREMENTS

The Room Requirements below represent information obtained from the Government describing specific space requirements. Plan dimensions listed should be considered as minimum requirements used for planning purposes. Extensive interviews with the Government and a close study of their existing and new space requirements have been utilized to develop this information. Deviations may not be viewed favorably.

5.1 CMV 22B Composite Shop

101 - Office

Space Characteristics

Function/adjacencies: Administrative office space. Adjacent to main entrance.

Special Dimensions: N/A

Minimum Ceiling Height: Refer to Space Tabulations.

Acoustics: Separating partitions must have an STC rating of 45 minimum.

Access: Provide interior corridor access.

Number of Occupants: Refer to Space Tabulations.

Other/Special Requirements: N/A

FF&E Info for Coordination: Contractor's Interior Designer to determine FF&E requirements based on in-depth interviews with the Activity at the Concept Design Workshop. FF&E is included in CLIN0001AA and must be coordinated with building utilities. Space must accommodate at a minimum:

- (1) desk with hutch and ergonomic task chair
- (2) stackable guest chairs
- (1) 2-drawer lateral filing cabinet
- include desk side trash and recycling receptacles for each desk
- (1) wall-mounted clock.

Audio / Visual System Info: Provide temperature and humidity sensor with wall mounted digital display.

Security System: N/A

Uniformat Section	Description	Qty	Size	Specific Requirements
B2010	Exterior Walls			Composite Wall - Concrete masonry units (CMU) wall backup construction with rigid insulation, air barrier, and air gap within cavity and a masonry veneer/metal wall panel closure.
B202001	Exterior Windows	1		Provide metal windows on exterior wall for natural light. ATPF; provide solid surface material across sills.
B202004	Exterior Glazing	1		Insulated – Low 'E' glazing.
C101001	Fixed Partitions			CMU

101 - Office

Uniformat Section	Description	Qty	Size	Specific Requirements
C102001	Interior Doors	1	3'-0" x 7'-0"	Wood or hollow metal door in hollow metal frame.
C102007	Interior Door Hardware	A/R		
C103003	Marker Board	1	4'-0" x 4'-0" min.	Glass marker board.
C103003	Tack Board	1	4'-0" x 4'-0" min.	Cork tack board.
C103004	Identifying Devices	A/R	A/R	Room number and corresponding identification symbol at each room entry.
C301001	Wall Finishes			Painted CMU
C302007	Floor Finishes			Integral resinous epoxy cove base
C302009	Floor Finishes			Resinous epoxy floor
C303001	Ceiling Finishes			Acoustical ceiling tile.
C303005	Suspension Systems			Acoustical ceiling tile grid.
D30	HVAC			Provide 4 pipe fan coil unit with ducted supply and return for both heating and cooling. Provide ventilation according to ASHRAE Std 62.2
D5020	Lighting			Provide recessed LED fixture. Provide occupancy sensors.
D5020	Power			Provide dedicated power or dedicated flush mounted quadruplex receptacle to work station based on final furniture selection.
D503001	Communication	1		Provide telephone line outlet on wall.
D503001	Communication	1		Provide data outlet with 2 ports.

102 – Electrical / Telecommunications

Space Characteristics

Function/adjacencies: A space for the telecommunications and electrical panels and other electrical equipment that service the building. Adjacent to Office 101.

Special Dimensions: N/A

Minimum Ceiling Height: Refer to Space Tabulations.

Acoustics: Provide sound and vibration isolation from all occupied spaces.

Access: Provide direct double door access from exterior.

Number of Occupants: Refer to Space Tabulations.

Other/Special Requirements: N/A

FF&E Info for Coordination: N/A

Audio / Visual System Info: N/A

Security System: N/A

Uniformat Section	Description	Qty	Size	Specific Requirements
B2010	Exterior Walls			Composite Wall - Concrete masonry units (CMU) wall backup construction with rigid insulation, air barrier, and air gap within cavity and a masonry veneer/metal wall panel closure.
B203001	Exterior Doors	1 Pair	3'-0" x 7'-0"	Steel Doors and Frames – Use exterior door and frame for access into electrical spaces. Doors and frames shall be factory primed and field painted. Provide fully weather stripped, thermally insulated doors as required.
B203008	Exterior Door Hardware	A/R		
C101001	Fixed Partitions			CMU
C103004	Identifying Devices	A/R	A/R	Room number and corresponding identification symbol at each room entry.
C301001	Wall Finishes			Painted CMU
C302007	Floor Finishes			Epoxy based sealant caulking
C302090	Floor Finishes			Sealed concrete
C3030	Ceiling Finishes			Exposed
D30	HVAC			Provide air conditioning and heating with a dedicated ductless split system heat pump with electric supplemental heat.

102 – Electrical / Telecommunications

Uniformat Section	Description	Qty	Size	Specific Requirements
D5020	Lighting			Provide industrial LED light fixtures.
D5020	Power			Provide electrical connections for communication equipment.
D5020	Power			Provide 480V 3 phase 4 wire main distribution panelboard, 480/208V step down transformer and 208V 3 phase 4 wire panelboard. Panelboards shall be sized to accommodate building load and shall include the UFC required amount of additional spare breakers.
D5030	Telecommunications			Provide communication equipment, including but not limited to, equipment racks, patch panels connector block.
D5030	Telecommunications			Provide 3/4" fire rated plywood back board on three walls.
D509003	Grounding			Provide grounding for both telecommunications and power systems.

103 – Mechanical

Space Characteristics

Function/adjacencies: Provides the necessary space to support the mechanical equipment needs of the facility. Adjacent to Electrical / Communications 102.

Special Dimensions: N/A

Minimum Ceiling Height: Refer to Space Tabulations.

Acoustics: Provide sound and vibration isolation from all occupied spaces.

Access: Provide direct double door access from exterior.

Number of Occupants: Refer to Space Tabulations.

Other/Special Requirements: N/A

FF&E Info for Coordination: N/A

Audio / Visual System Info: N/A

Security System: N/A

Uniformat Section	Description	Qty	Size	Specific Requirements
B2010	Exterior Walls			Composite Wall - Concrete masonry units (CMU) wall backup construction with rigid insulation, air barrier, and air gap within cavity and a masonry veneer/metal wall panel closure.
B203001	Exterior Doors	1 Pair	3'-0" x 7'-0"	Steel Doors and Frames – Use exterior door and frame for access into mechanical spaces. Doors and frames shall be factory primed and field painted. Provide fully weather stripped, thermally insulated doors as required.
B203008	Exterior Door Hardware	A/R		
C101001	Fixed Partitions			CMU
C103004	Identifying Devices	A/R	A/R	Room number and corresponding identification symbol at each room entry.
C301001	Wall Finishes			Painted CMU
C302007	Floor Finishes			Epoxy based sealant caulking
C302090	Floor Finishes			Sealed concrete
C3030	Ceiling Finishes			Exposed
D202002	Valves & Hydrants	A/R		Provide hose bibb.

103 – Mechanical

Uniformat Section	Description	Qty	Size	Specific Requirements
D203003	Floor Drains	1		Provide floor drains.
D209005	Compressed Air System (Non-breathing)			Provide 120 PSI constant pressure air compressors, refrigerated air dryer, after cooler, air receiver, and filters.
D30	HVAC			Provide 4 pipe fan coil unit with ducted supply and return for both heating and cooling. Provide ventilation according to ASHRAE Std 62.2.
D5020	Lighting			Provide industrial LED light fixtures.
D5020	Power			Provide electrical connections for HVAC equipment.
D5030	Telecommunications			Provide data connection to building energy management control panel.

104 – Unisex

Space Characteristics

Function/adjacencies: Provides single occupancy restroom. Adjacent to Mechanical 103.

Special Dimensions: N/A

Minimum Ceiling Height: Refer to Space Tabulations.

Acoustics: N/A

Access: Provide interior corridor access.

Number of Occupants: Refer to Space Tabulations.

Other/Special Requirements: N/A

FF&E Info for Coordination: N/A

Audio / Visual System Info: N/A

Security System: N/A

Uniformat Section	Description	Qty	Size	Specific Requirements
B2010	Exterior Walls			Composite Wall - Concrete masonry units (CMU) wall backup construction with rigid insulation, air barrier, and air gap within cavity and a masonry veneer/metal wall panel closure.
C101001	Fixed Partitions			CMU
C102001	Interior Doors	1	3'-0" x 7'-0"	Wood or hollow metal door in hollow metal frame.
C102007	Interior Door Hardware	A/R		
C103002	Toilet Accessories			As required for full-service accessible restroom facility. Provide toilet accessories including coat hooks, robe hooks, grab bars, and double toilet tissue dispensers at each toilet stall. Provide paper towel dispenser/disposals, sanitary napkin disposals, robe hooks, and full height dressing mirror. Provide mirror – minimum 36"H that runs the full width of the lavatory. Provide soap dispensers, seat cover dispenser and high efficiency hand dryer.
C103004	Identifying Devices	A/R	A/R	Room number and corresponding identification symbol at each room entry.
C301004	Wall Finishes			Full height tile at all interior partitions.
C302007	Floor Finishes			Integral resinous epoxy cove base
C302009	Floor Finishes			Resinous epoxy floor
C303001	Ceiling Finishes			Moisture-resistant acoustical ceiling tile.
C303005	Ceiling Finishes			Moisture-resistant acoustical ceiling tile grid.

104 – Unisex

Uniformat Section	Description	Qty	Size	Specific Requirements
D201001	Water Closets	1		Floor-mounted; flush valve; ADA accessible.
D201003	Lavatories	1		Wall hung, self-rimming vitreous china type with P-trap, electronic faucet with aerator; ADA accessible.
D202002	Valves & Hydrants	A/R		
D203003	Floor Drains	1		Provide floor drains.
D30	HVAC			Provide continuous exhaust and thermostatic valve controlled hot water convactor or fin tube radiator.
D5020	Lighting			Provide recessed LED fixture. Provide occupancy sensors.
D5020	Power			Provide GFCI receptacles and electrical connections to HVAC equipment as required.

105 – Unisex

Space Characteristics

Function/adjacencies: Provides single occupancy restroom. Adjacent to Unisex 104.

Special Dimensions: N/A

Minimum Ceiling Height: Refer to Space Tabulations.

Acoustics: N/A

Access: Provide interior corridor access.

Number of Occupants: Refer to Space Tabulations.

Other/Special Requirements: N/A

FF&E Info for Coordination: N/A

Audio / Visual System Info: N/A

Security System: N/A

Uniformat Section	Description	Qty	Size	Specific Requirements
B2010	Exterior Walls			Composite Wall - Concrete masonry units (CMU) wall backup construction with rigid insulation, air barrier, and air gap within cavity and a masonry veneer/metal wall panel closure.
C101001	Fixed Partitions			CMU
C102001	Interior Doors	1	3'-0" x 7'-0"	Wood or hollow metal door in hollow metal frame.
C102007	Interior Door Hardware	A/R		
C103002	Toilet Accessories			As required for full-service accessible restroom facility. Provide toilet accessories including coat hooks, robe hooks, grab bars, and double toilet tissue dispensers at each toilet stall. Provide paper towel dispenser/disposals, sanitary napkin disposals, robe hooks, and full height dressing mirror. Provide mirror – minimum 36"H that runs the full width of the lavatory. Provide soap dispensers, seat cover dispenser and high efficiency hand dryer.
C103004	Identifying Devices	A/R	A/R	Room number and corresponding identification symbol at each room entry.
C301004	Wall Finishes			Full height tile at all interior partitions.
C302007	Floor Finishes			Integral resinous epoxy cove base
C302009	Floor Finishes			Resinous epoxy floor
C303001	Ceiling Finishes			Moisture-resistant acoustical ceiling tile.

105 – Unisex

Unifomat Section	Description	Qty	Size	Specific Requirements
C303005	Ceiling Finishes			Moisture-resistant acoustical ceiling tile grid.
D201001	Water Closets	1		Floor-mounted; flush valve; ADA accessible.
D201003	Lavatories	1		Wall hung, self-rimming vitreous china type with P-trap, electronic faucet with aerator; ADA accessible.
D202002	Valves & Hydrants	A/R		
D203003	Floor Drains	1		Provide floor drains.
D30	HVAC			Provide continuous exhaust and thermostatic valve controlled hot water convactor or fin tube radiator
D5020	Lighting			Provide recessed LED fixture. Provide occupancy sensors.
D5020	Power			Provide GFCI receptacles and electrical connections to HVAC equipment as required.

106 – Janitor

Space Characteristics

Function/adjacencies: Space for the cleaning and maintenance needs of the facility. Adjacent to Unisex 105.

Special Dimensions: N/A

Minimum Ceiling Height: Refer to Space Tabulations.

Acoustics: N/A

Access: Provide interior corridor access.

Number of Occupants: Refer to Space Tabulations.

Other/Special Requirements: N/A

FF&E Info for Coordination: N/A

Audio / Visual System Info: N/A

Security System: N/A

Uniformat Section	Description	Qty	Size	Specific Requirements
B2010	Exterior Walls			Composite Wall - Concrete masonry units (CMU) wall backup construction with rigid insulation, air barrier, and air gap within cavity and a masonry veneer/metal wall panel closure.
C101001	Fixed Partitions			CMU
C102001	Interior Doors	1	3'-0" x 7'-0"	Wood or hollow metal door in hollow metal frame.
C102007	Interior Door Hardware	A/R		
C103004	Identifying Devices	A/R	A/R	Room number and corresponding identification symbol at each room entry.
C103006	Shelving	1	A/R	Stainless steel wall-mounted mop rack.
C301001	Wall Finishes			Painted CMU
C301090	Wall Finishes			48"H stainless steel wall panels located behind mop sink.
C302007	Floor Finishes			Integral resinous epoxy cove base
C302009	Floor Finishes			Resinous epoxy floor
C303001	Ceiling Finishes			Moisture-resistant acoustical ceiling tile.

106 – Janitor

Uniformat Section	Description	Qty	Size	Specific Requirements
C303005	Ceiling Finishes			Moisture-resistant acoustical ceiling tile grid.
D201004	Mop Sink	1		Floor mounted mop sink with raised screen floor drain.
D202002	Valves & Hydrants	A/R		Provide hose bibb.
D203003	Floor Drains	1		Provide floor drains.
D30	HVAC			Provide continuous exhaust and thermostatic valve controlled hot water convector or fin tube radiator
D5020	Lighting			Provide recessed LED fixture. Provide occupancy sensors.
D5020	Power			Provide GFCI receptacles and electrical connections to HVAC equipment as required.

107 – Epoxy Storage and Mixing

Space Characteristics

Function/adjacencies: Space for storage of epoxy materials. Adjacent to Paint Storage and Mixing 108.

Special Dimensions: N/A

Minimum Ceiling Height: Refer to Space Tabulations.

Acoustics: N/A

Access: Provide interior corridor access and exterior access door.

Number of Occupants: Refer to Space Tabulations.

Other/Special Requirements: N/A

FF&E Info for Coordination: Contractor's Interior Designer to determine FF&E requirements based on in-depth interviews with the Activity at the Concept Design Workshop. FF&E is included in CLIN0001AA and must be coordinated with building utilities. Space must accommodate at a minimum:

- (1) 2'-0" x 8'-0" stainless steel work bench
- (2) 2-Gallon flammable supply storage lockers
- (1) cold storage freezer (0 degrees)
- (1) cold storage freezer (40 degrees)
- (1) wall-mounted clock.
- (1) digital scale

Audio / Visual System Info: Provide remote telephone notification system.

Security System: N/A

Uniformat Section	Description	Qty	Size	Specific Requirements
B2010	Exterior Walls			Composite Wall - Concrete masonry units (CMU) wall backup construction with rigid insulation, air barrier, and air gap within cavity and a masonry veneer/metal wall panel closure.
B203001	Exterior Doors	1	3'-0" x 7'-0"	Steel Door and Frame – Use exterior door and frame for exterior access. Doors and frames shall be factory primed and field painted. Provide fully weather stripped, thermally insulated door as required.
B203008	Exterior Door Hardware	A/R		
C101001	Fixed Partitions			CMU
C102001	Interior Doors	1	3'-0" x 7'-0"	Wood or hollow metal door in hollow metal frame.
C102007	Interior Door Hardware	A/R		
C103004	Identifying Devices	A/R	A/R	Room number and corresponding identification symbol at each room entry.
C301001	Wall Finishes			Painted CMU
C302007	Floor Finishes			Integral resinous epoxy cove base

107 – Epoxy Storage and Mixing

Uniformat Section	Description	Qty	Size	Specific Requirements
C302009	Floor Finishes			Resinous epoxy floor
C3030	Ceiling Finishes			Exposed
D209005	Compressed Air System (Non-breathing)	1	3/8"	Provide compressed air hose drop for mixing equipment.
D30	HVAC			Provide 4 pipe fan coil unit with ducted supply and return for both heating and cooling. Provide ventilation according to ASHRAE Std 62.2 and UFC 3-410-04 . Maintain relative humidity below 60% by cycling the cooling and heating coils so that space is not over cooled
D5020	Lighting			Provide industrial LED light fixtures. Provide room with occupancy sensors.
D5020	Power			Provide required power/electrical connections for freezer equipment. Provide general receptacle at 48-inches above finished floor. Provide electrical connections to HVAC equipment as required.
D509003	Grounding			Provide ground connections for flammable storage cabinet.

108 – Paint Storage and Mixing

Space Characteristics

Function/adjacencies: Space for storage of paint materials and mixing / preparation of paint materials. Adjacent to Epoxy Storage and Mixing 107.

Special Dimensions: N/A

Minimum Ceiling Height: Refer to Space Tabulations.

Acoustics: N/A

Access: Provide interior corridor access and direct interior access to Paint Booth Room.

Number of Occupants: Refer to Space Tabulations.

Other/Special Requirements: Class 1 Division 1 (Paint Storage) & Division 2 (Paint Mixing) Hazard Environment

FF&E Info for Coordination: Contractor's Interior Designer to determine FF&E requirements based on in-depth interviews with the Activity at the Concept Design Workshop. FF&E is included in CLIN0001AA and must be coordinated with building utilities. Space must accommodate at a minimum:

- (1) 2'-0" x 6'-0" work table on lockable casters
- (2) 3'-0" x 4'-0" work bench
- (2) 60-Gallon HAZMAT supply storage lockers
- (1) table-mounted paint mixer/agitator

Audio / Visual System Info: Provide remote telephone notification system.

Security System: N/A

Uniformat Section	Description	Qty	Size	Specific Requirements
B2010	Exterior Walls			Composite Wall - Concrete masonry units (CMU) wall backup construction with rigid insulation, air barrier, and air gap within cavity and a masonry veneer/metal wall panel closure.
C101001	Fixed Partitions			CMU
C102001	Interior Doors	2	3'-0" x 7'-0"	Wood or hollow metal door in hollow metal frame.
C102007	Interior Door Hardware	A/R		
C103004	Identifying Devices	A/R	A/R	Room number and corresponding identification symbol at each room entry.
C301001	Wall Finishes			Painted CMU
C302007	Floor Finishes			Integral resinous epoxy cove base
C302009	Floor Finishes			Resinous epoxy floor
C3030	Ceiling Finishes			Exposed

108 – Paint Storage and Mixing

Uniformat Section	Description	Qty	Size	Specific Requirements
D209005	Compressed Air System (Non-breathing)	1	3/8"	Provide compressed air hose drop for paint gun cleaner.
D30	HVAC			Provide 4 pipe fan coil unit with ducted supply and return for both heating and cooling. Provide ventilation according to ASHRAE Std 62.2 and UFC 3-410-04 . Maintain relative humidity below 60% by cycling the cooling and heating coils so that space is not over cooled
D304007	Fume Exhaust Hood	1		1/2 horsepower exhaust hood with dedicated exhaust fan and direct ducting to exterior.
D5020	Lighting			Light fixtures must be rated for Class 1 Division 1 hazard environment.
D5020	Power			Rated for Class 1 Division 1 hazard environment. Provide power connection as required for paint agitator. Provide electrical connections to HVAC equipment as required.
D509003	Grounding			Provide ground for storage / hazmat safety cabinet.

109 – Corridor

Space Characteristics

Function/adjacencies: Interior circulation space.

Special Dimensions: N/A

Minimum Ceiling Height: Refer to Space Tabulations.

Acoustics: N/A

Access: Exterior doors; interior circulation doors as indicated.

Number of Occupants: Refer to Space Tabulations.

Other/Special Requirements: N/A

FF&E Info for Coordination: N/A

Audio / Visual System Info: N/A

Security System: N/A

Uniformat Section	Description	Qty	Size	Specific Requirements
B2010	Exterior Walls			Composite Wall - Concrete masonry units (CMU) wall backup construction with rigid insulation, air barrier, and air gap within cavity and a masonry veneer/metal wall panel closure.
B203001	Exterior Doors	2	3'-0" x 7'-0"	Steel Door and Frame – Use exterior door and frame for exterior access. Doors and frames shall be factory primed and field painted. Provide fully weather stripped, thermally insulated door as required.
B203008	Exterior Door Hardware	A/R		
C101001	Fixed Partitions			CMU
C102001	Interior Doors	10 (counted with other rooms)	3'-0" x 7'-0"	Wood or hollow metal door in hollow metal frame.
C102007	Interior Door Hardware	A/R		
C103004	Identifying Devices	A/R	A/R	Room number and corresponding identification symbol at each room entry.
C103014	Entrance Floor Grilles and Mats	A/R	A/R	Entry Mat
C301001	Wall Finishes			Painted CMU
C302007	Floor Finishes			Integral resinous epoxy cove base

109 – Corridor

Uniformat Section	Description	Qty	Size	Specific Requirements
C302009	Floor Finishes			Resinous epoxy floor
C303001	Ceiling Finishes			Acoustical ceiling tile.
C303005	Suspension Systems			Acoustical ceiling tile grid.
D30	HVAC			Provide 4 pipe fan coil unit with ducted supply and return for both heating and cooling. Provide ventilation according to ASHRAE Std 62.2.
D5020	Lighting			Provide recessed LED fixture. Provide occupancy sensors. Provide emergency egress lighting and exit signs are required.
D5020	Power			Provide convenience duplex receptacle 20-foot on center in the corridor. Provide electrical connections to HVAC equipment as required.

110 – Machining / Grinding

Space Characteristics

Function/adjacencies: Space for machining and grinding repairs to aircraft parts and equipment. Adjacent to Clean/Prep Room 111.

Special Dimensions: Top of monorail beam at 12'-0" above finished floor.

Minimum Ceiling Height: Refer to Space Tabulations.

Acoustics: N/A

Access: Exterior access man-doors and industrial sliding doors; interior industrial sliding doors; interior corridor access; direct interior access to Clean/Prep Room.

Number of Occupants: Refer to Space Tabulations.

Other/Special Requirements: 1-ton overhead monorail crane system.

FF&E Info for Coordination: Contractor's Interior Designer to determine FF&E requirements based on in-depth interviews with the Activity at the Concept Design Workshop. FF&E is included in CLIN0001AA and must be coordinated with building utilities. Space must accommodate at a minimum:

- (4) sawhorses (2 pairs)
- (1) 5'-0" x 2'-2.5" industrial storage locker
- (6) 4'-0" x 1'-6" industrial freestanding 4-shelf unit
- (2) 4'-1" x 6'-1" Downtron industrial downdraft tables (see Part 6 for specifications)
- (2) PAPCE vacuum system (see Part 6 for specifications)
- (2) adjustable height swivel stools on casters
- (1) bench
- (1) large HAZMAT waste receptacle
- (1) large waste receptacle
- (1) wall-mounted clock

Audio / Visual System Info: Provide remote telephone notification system.

Security System: N/A

Uniformat Section	Description	Qty	Size	Specific Requirements
B2010	Exterior Walls			Composite Wall - Concrete masonry units (CMU) wall backup construction with rigid insulation, air barrier, and air gap within cavity and a masonry veneer/metal wall panel closure.
B203001	Exterior Doors	1	3'-0" x 7'-0"	Steel Door and Frame – Use exterior door and frame for exterior access. Doors and frames shall be factory primed and field painted. Provide fully weather stripped, thermally insulated door as required.
B203008	Exterior Door Hardware	A/R		
B203090	Exterior Specialty Doors	1 Pair	6'-0" x 12'-0"	Insulated industrial sliding double doors capable of allowing passage of the monorail crane system. Doors must be mounted to exterior face of building when possible.
C101001	Fixed Partitions			CMU

110 – Machining / Grinding

Uniformat Section	Description	Qty	Size	Specific Requirements
C101005	Interior Windows	2	6'-0" x 4'-0"	Hollow metal frame, single pane, fixed, tempered, impact resistant.
C1020	Interior Doors	1	3'-0" x 7'-0"	Wood or hollow metal door in hollow metal frame.
C102007	Interior Door Hardware	A/R		
C102004	Interior Sliding Doors	1 Pair	6'-0" x 12'-0"	Industrial sliding double doors capable of allowing passage of the monorail crane system.
C103004	Identifying Devices	A/R	A/R	Room number and corresponding identification symbol at each room entry.
C301001	Wall Finishes			Painted CMU
C302007	Floor Finishes			Integral resinous epoxy cove base
C302009	Floor Finishes			Resinous epoxy floor; anti-slip finish, anti-spill absorb
C3030	Ceiling Finishes			Exposed
D102002	Overhead Cranes		1-ton	Omni-directional electric monorail crane system. Starts before room 25' over exterior concrete apron
D201090	Emergency Fixture	1		Provide emergency shower and eyewash station. Locate opposite corner from personnel door.
D209005	Compressed Air System (Non-breathing)	7	(2) 1" (5) 3/8"	Provide compressed air drops and hose reels. (2) drops with 1-inch drives, opposite corners of room. (4) drops with 3/8" drives in third points along room width (ceiling reel). Also provide (1) 3/8" wall mounted drop
D30	HVAC			Provide 4 pipe fan coil unit with ducted supply and return for both heating and cooling. Provide ventilation according to ASHRAE Std 62.2 and UFC 3-410-04 . Maintain relative humidity below 60% by cycling the cooling and heating coils so that space is not over cooled
D5010	Hazard Classification			Area must meet the requirements of NEC Article 516.
D5020	Lighting			Provide dust proof LED fixtures. Fixtures must utilized T5HO lamps.
D5020	Power			Provide power connections for FF&E equipment and overhead crane as required. Provide quad receptacles every 10 foot. Receptacles must be mounted at 48-inches above finished floor.
D503090	Telecommunications			Provide system to alert personnel when there are incoming telephone calls in office

110 – Machining / Grinding

Unifomat Section	Description	Qty	Size	Specific Requirements
E1040	Vacuum System	1		Existing equipment. Tiger Vac Air with filtration system.
E1040	Clayton System			Existing equipment. Pneumatic, runs off air compressor.
E1040	Vacuum System	1		Existing equipment. PAPCE Arm Vacuum System.

111 – Clean / Prep

Space Characteristics

Function/adjacencies: Space for cleaning aircraft parts and equipment and preparing it for the Layup/Bonding Room. Adjacent to Machining/Grinding 110 and Layup/Bonding 112.

Special Dimensions: Top of monorail beam at 12'-0" above finished floor.

Minimum Ceiling Height: Refer to Space Tabulations.

Acoustics: N/A

Access: Interior industrial sliding doors; exterior access door; interior corridor access; direct interior access to Layup/Bonding Room.

Number of Occupants: Refer to Space Tabulations.

Other/Special Requirements: 1-ton overhead monorail crane system.

FF&E Info for Coordination: Contractor's Interior Designer to determine FF&E requirements based on in-depth interviews with the Activity at the Concept Design Workshop. FF&E is included in CLIN0001AA and must be coordinated with building utilities. Space must accommodate at a minimum:

- (4) sawhorses (2 pairs)
- (1) Tiger Vac air filtration system (see Part 6 for specifications)
- (2) Clayton air vacuum systems (see Part 6 for specifications)
- (2) 3'-0" x 8'-0" stainless steel tables on lockable casters
- (2) adjustable height swivel stools on casters
- (1) large HAZMAT waste receptacle
- (1) large waste receptacle
- (1) wall-mounted clock

Audio / Visual System Info: Provide remote telephone notification system.

Security System: N/A

Uniformat Section	Description	Qty	Size	Specific Requirements
B2010	Exterior Walls			Composite Wall - Concrete masonry units (CMU) wall backup construction with rigid insulation, air barrier, and air gap within cavity and a masonry veneer/metal wall panel closure.
B203001	Exterior Doors	1	3'-0" x 7'-0"	Steel Door and Frame – Use exterior door and frame for exterior access. Doors and frames shall be factory primed and field painted. Provide fully weather stripped, thermally insulated door as required.
B203008	Exterior Door Hardware	A/R		
C101001	Fixed Partitions			CMU
C101005	Interior Windows	2	6'-0" x 4'-0"	Hollow metal frame, single pane, fixed, tempered, impact resistant.
C102001	Interior Doors	1	3'-0" x 7'-0"	Wood or hollow metal door in hollow metal frame.
C102007	Interior Door Hardware	A/R		

111 – Clean / Prep

Uniformat Section	Description	Qty	Size	Specific Requirements
C102004	Interior Sliding Doors	1 Pair	6'-0" x 12'-0"	Industrial sliding double doors capable of allowing passage of the monorail crane system.
C103004	Identifying Devices	A/R	A/R	Room number and corresponding identification symbol at each room entry.
C301001	Wall Finishes			Painted CMU
C302007	Floor Finishes			Integral resinous epoxy cove base
C302009	Floor Finishes			Resinous epoxy floor; anti-slip finish, anti-spill absorb
C3030	Ceiling Finishes			Exposed
D102002	Overhead Cranes		1-ton	Omni-directional electric monorail crane system.
D201090	Emergency Fixture	1		Provide emergency shower and eyewash station. Locate opposite corner from personnel door.
D209005	Compressed Air System (Non-breathing)	4	(1) 1" (3) 3/8"	Provide compressed air drops and 50-foot long hose reels. (2) drops with 3/8" drives on each side of room (ceiling reel). Also provide (1) 3/8" wall mounted drop and (1) 1" wall mounted drop on corridor wall.
D30	HVAC			Provide 4 pipe fan coil unit with ducted supply and return for both heating and cooling. Provide ventilation according to ASHRAE Std 62.2 and UFC 3-410-04 . Maintain relative humidity below 60% by cycling the cooling and heating coils so that space is not over cooled
D5010	Hazard Classification			Area must meet the requirements of NEC Article 516.
D5020	Lighting			Provide dust proof LED fixtures.
D5020	Power			Provide power connections for FF&E equipment and overhead crane as required. Provide quad receptacles every 10 foot. Receptacles must be mounted at 48-inches above finished floor.
D503090	Telecommunications			Provide system to alert personnel when there are incoming telephone calls in office.

112 – Layup / Bonding

Space Characteristics

Function/adjacencies: Space for performing repairs to aircraft parts and equipment. Adjacent to Paint Booth Room 113 and Clean/Prep 111 and near Epoxy Storage and Mixing Room 107.

Special Dimensions: Top of monorail beam at 12'-0" above finished floor.

Minimum Ceiling Height: Refer to Space Tabulations.

Acoustics: N/A

Access: Interior industrial sliding doors; exterior access door; interior corridor access; direct interior access to Paint Booth Room.

Number of Occupants: Refer to Space Tabulations.

Other/Special Requirements: 1-ton overhead monorail crane system.

FF&E Info for Coordination: Contractor's Interior Designer to determine FF&E requirements based on in-depth interviews with the Activity at the Concept Design Workshop. FF&E is included in CLIN0001AA and must be coordinated with building utilities. Space must accommodate at a minimum:

- (4) sawhorses (2 pairs)
- (2) 3'-0" x 8'-0" stainless steel tables on lockable casters
- (2) 3'-0" x 5'-0" stainless steel tables on lockable casters
- (2) adjustable height swivel stools on casters
- (1) large HAZMAT waste receptacle
- (1) large waste receptacle
- (1) wall-mounted clock

Audio / Visual System Info: Provide remote telephone notification system.

Security System: N/A

Uniformat Section	Description	Qty	Size	Specific Requirements
B2010	Exterior Walls			Composite Wall - Concrete masonry units (CMU) wall backup construction with rigid insulation, air barrier, and air gap within cavity and a masonry veneer/metal wall panel closure.
B203001	Exterior Doors	1	3'-0" x 7'-0"	Steel Door and Frame – Use exterior door and frame for exterior access. Doors and frames shall be factory primed and field painted. Provide fully weather stripped, thermally insulated door as required.
C101001	Fixed Partitions			CMU
C101005	Interior Windows	2	6'-0" x 4'-0"	Hollow metal frame, single pane, fixed, tempered.
C102001	Interior Doors	1	3'-0" x 7'-0"	Wood or hollow metal door in hollow metal frame.
C102007	Interior Door Hardware	A/R		
C102004	Interior Sliding Doors	1 Pair	6'-0" x 12'-0"	Industrial sliding double doors capable of allowing passage of the monorail crane system.

112 – Layup / Bonding

Uniformat Section	Description	Qty	Size	Specific Requirements
C103004	Identifying Devices	A/R	A/R	Room number and corresponding identification symbol at each room entry.
C301001	Wall Finishes			Painted CMU
C302007	Floor Finishes			Integral resinous epoxy cove base
C302009	Floor Finishes			Resinous epoxy floor; anti-slip finish, anti-spill absorb
C3030	Ceiling Finishes			Exposed
D102002	Overhead Cranes		1-ton	Omni-directional electric monorail crane system.
D201090	Emergency Fixture	1		Provide emergency shower and eyewash station. Locate opposite corner from personnel door.
D209005	Compressed Air System (Non-breathing)	4	(1) 1" (3) 3/8"	Provide compressed air drops and 50-foot long hose reels. (2) drops with 3/8" drives on each side of room (ceiling reel). Also provide (1) 3/8" wall mounted drop and (1) 1" wall mounted drop on corridor wall.
D30	HVAC			Provide 4 pipe fan coil unit with ducted supply and return for both heating and cooling. Provide ventilation according to ASHRAE Std 62.2 and UFC 3-410-04 . Maintain relative humidity below 60% by cycling the cooling and heating coils so that space is not over cooled
D5010	Hazard Classification			Area must meet the requirements of NEC Article 516.
D5020	Lighting			Provide dust proof LED fixtures.
D5020	Power			Provide quad receptacles every 10 foot. Receptacles must be mounted at 48-inches above finished floor.
D5020	Power			Provide power connections to Exhaust Hood, composite repair shop equipment, and overhead crane as required.
D503090	Telecommunications			Provide system to alert personnel when there are incoming telephone calls in office.
E1040	Fabric Rack	1		Existing equipment. Freestanding 6-roll fabric storage rack with casters

113 – Paint Booth Room

Space Characteristics

Function/adjacencies: Space for applying corrosion control finishes. Adjacent to Paint Storage and Mixing 108 and Layup/Bonding Room 112.

Special Dimensions: Top of monorail beam at 12'-0" above finished floor.

Minimum Ceiling Height: Refer to Space Tabulations.

Acoustics: N/A

Access: Interior industrial sliding doors; exterior access door; interior corridor access; direct interior access to Layup/Bonding Room and Paint Storage and Mixing Room.

Number of Occupants: Refer to Space Tabulations.

Other/Special Requirements: 1-ton overhead monorail crane system. Self-contained paint booth.

FF&E Info for Coordination: Contractor's Interior Designer to determine FF&E requirements based on in-depth interviews with the Activity at the Concept Design Workshop. FF&E is included in CLIN0001AA and must be coordinated with building utilities. Space must accommodate at a minimum:

- (6) 4'-0" x 2'-0" x 6'-0" industrial shelving
- (1) bench
- (4) sawhorses (2 pairs)
- (1) 2'-0" x 6'-0" stainless steel tables on lockable casters
- (1) large HAZMAT waste receptacle
- (1) large waste receptacle
- (1) wall-mounted clock

Audio / Visual System Info: Provide remote telephone notification system.

Security System: N/A

Uniformat Section	Description	Qty	Size	Specific Requirements
B2010	Exterior Walls			Composite Wall - Concrete masonry units (CMU) wall backup construction with rigid insulation, air barrier, and air gap within cavity and a masonry veneer/metal wall panel closure.
B203001	Exterior Doors	3	3'-0" x 7'-0"	Steel Door and Frame – Use exterior door and frame for exterior access. Doors and frames shall be factory primed and field painted. Provide fully weather stripped, thermally insulated door as required.
B203090	Exterior Specialty Doors	1 Pair	6'-0" x 12'-0"	Insulated industrial sliding double doors capable of allowing passage of the monorail crane system. Doors must be mounted to exterior face of building when possible.
C101001	Fixed Partitions			CMU
C102001	Interior Doors	2	3'-0" x 7'-0"	Wood or hollow metal door in hollow metal frame.
C102007	Interior Door Hardware	A/R		
C102004	Interior Sliding Doors	1 Pair	6'-0" x 12'-0"	Industrial sliding double doors capable of allowing passage of the monorail crane system.

113 – Paint Booth Room

Uniformat Section	Description	Qty	Size	Specific Requirements
C103004	Identifying Devices	A/R	A/R	Room number and corresponding identification symbol at each room entry.
C103005	Lockers	2	15"W x 18"D x 72"H	Lockers made of high density polyethylene/solid plastic (HDPE) with interior coat rod and two coat hooks.
C301001	Wall Finishes			Painted CMU
C302007	Floor Finishes			Integral resinous epoxy cove base
C302009	Floor Finishes			Resinous epoxy floor; anti-slip finish, anti-spill absorb
C3030	Ceiling Finishes			Exposed
D102002	Overhead Cranes		1-ton	Omni-directional electric monorail crane system. Extends out of room 25' over exterior concrete apron.
D209005	Compressed Air System (Non-breathing)	2	(2) 3/8"	Provide (2) compressed air hose drops inside of paint booth with 3/8" drives.
D30	HVAC			Provide 4 pipe fan coil unit with ducted supply and return for both heating and cooling. Provide ventilation according to ASHRAE Std 62.2 and UFC 3-410-04 . Maintain relative humidity below 60% by cycling the cooling and heating coils so that space is not over cooled
D5010	Hazard Classification			Area must meet the requirements of NEC Article 516.
D5010	Power Connection			Provide required electrical service to self-contained paint booth.
D5020	Power			Provide power connections for FF&E equipment and overhead crane as required. Provide quad receptacles every 10 foot. Receptacles must be mounted at 48-inches above finished floor.
D5020	Lighting			Provide dust proof LED fixtures.
D503090	Telecommunications			Provide system to alert personnel when there are incoming telephone calls in office.
E109090	Specialized Equipment	1	Interior work space (12'W x 26'L x 12'H min)	Self-contained paint booth, including all required ventilation, filtration, and automated curing capabilities. Maintenance access stair to include equipment platform is to be provided. Doors to paint booth must swing and allow passage of the monorail crane system (both ends). Provide Paint Spray Booth as a complete package including HVAC and controls according to Prescriptive Specification 11 50 10 PAINT SPRAY BOOTH in Part 5 of the RFP

6.0 ENGINEERING SYSTEM REQUIREMENTS

6. ENGINEERING SYSTEMS REQUIREMENTS

A10 FOUNDATIONS

SYSTEM DESCRIPTION

Provide the building foundation system in accordance with UFC 3-301-01, *Structural Engineering* and UFC 3-220-01, *Geotechnical Engineering*. Foundation must be designed to suit subsurface conditions, and must be capable of transmitting all building loads to the ground. See Section B10, *Superstructure*, for additional loading criteria.

A10 GENERAL

GOVERNMENT PROVIDED GEOTECHNICAL INFORMATION

Subsurface soil information from the project site and vicinity of the project site is included in the Part 6 Attachments, of this RFP.

Refer to Part 3 Section 3.1.6 Existing Geologic and Geotechnical Site Conditions and 3.1.7 Geotechnical Information & Requirements. The Contractor must bear all costs of the Geotechnical Engineering Consultation and Study.

SEISMIC DESIGN

A site-specific seismic ground motion study is not required.

The design must use a seismic site classification D. Seismic Site Class must be determined in accordance with UFC 3-220-01.

A1010 STANDARD FOUNDATIONS

As determined by the Designer of Record to be applicable, provide an appropriate Standard Foundation system to support the structures associated with this project. "Standard Foundations" are deep foundations as specifically addressed in 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 construction of the new building foundations. The program must include locations and quantity of monitoring points for vibration and settlement on existing buildings and/or facilities near the propose building sites 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

The structure(s) must be entirely supported by a pile 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. A foundation system using only pile supported grade beams will not be permitted. 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 to 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 must be limited to $\frac{1}{2}$ 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 must be defined as an angular distortion of less than $\frac{1}{500}$ 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 are limited to $\frac{1}{4}$ 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, preaugering 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 STRUCTURALLY SUPPORTED SLAB

Provide a structurally (i.e. pile) supported slab. Total post-construction settlement of the slab must be limited to ¼ inch. Provide stainless steel support hangers adequately sized and spaced to support all under-slab utility lines. Flexible connections must be provided as necessary to allow for differential settlement between the structurally supported under-slab utility lines and soil supported utility lines at the service connections outside of the building footprint. Where the structurally supported slab is below the existing adjacent exterior grade, provide water/dampproofing and a perimeter drainage system to remove ground water from the area immediately adjacent to the buildings. Provide under slab insulation in accordance with ASHRAE 189.1, Normative Appendix A.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

A20 BASEMENT CONSTRUCTION

Not Used.

--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*.

In addition, design the structure in accordance with the following loading criteria:

Roof Collateral Load: 20 psf, minimum or actual equipment furnished (to account for suspended architectural, mechanical, plumbing, fire protection, and electrical components).

Live Loads

Provide for live loads for occupancies or uses not provided in UFC 3-301-01, *Structural Engineering* as follows:

Occupancy or Use: II

Uniform Live load: 150 psf, minimum.

1-Ton Monorail Crane loading, suspended from roof structure

Paint Booth: Uniform Roof Live Load: 40 psf, minimum, and a 300 pound concentrated load, in addition to all applicable handrail/stair loadings.

Live Loading requirements must be reconfirmed with End User prior to design of structural components.

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 B and site coefficients $F_a = 1.6$ and $F_v = 2.4$ will be used.

Wind Exposure

Base wind on Exposure D. Hurricane and windborne debris region.

B1010 FLOOR CONSTRUCTION

Not used – the building is a single story without intermediate floors.

B1020 ROOF CONSTRUCTION

The roof construction may include any structural framing system meeting the requirements of this section: steel roof deck on steel joists, steel roof deck on steel beams, non-composite concrete slabs on form deck on steel joists, non-composite concrete slabs on form deck on steel beams, composite concrete slabs on composite steel deck, cast-in-place concrete slabs on removable forms, or precast concrete slabs.

The roof deck must be supported on concrete masonry walls.

--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 primary exterior material of the building will be concrete masonry unit (CMU) load-bearing walls.

Provide a ventilated, rain-screen, exterior wall system composed of the Exterior Closure and the Exterior Wall Backup Construction indicated below. Provide complete with flashing, weeps, closures and other components as necessary for watertight construction.

EIFS may 'not' be used as an exterior wall finish material.

B201001 EXTERIOR CLOSURE

Provide brick masonry and insulated metal panel details consistent with the existing adjacent buildings.

B201002 EXTERIOR WALL BACKUP CONSTRUCTION

Provide Exterior Wall Back-up Construction System (back-up systems for Exterior Closure) including unit masonry.

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*.

Provide a continuous air barrier to control air leakage into, and out of conditioned spaces. The air barrier must encompass all elements of the facility that are exposed to the outside environment or outside environmental conditions such as roof, walls, floors, and compartmentalized unconditioned

portions of the facility such as garages, and negatively pressurized spaces. Permanently seal penetrations through the air barrier, joints in the air barrier, adjoining construction, and transitions to different air barrier materials.

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

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

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

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

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

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

1. Typical conditions at wall sections.
2. Barrier treatment at wall openings.
3. Intersections with other exterior enclosure assemblies and materials. Include intersections at roof and floors.
4. Intersections with counter flashing.
5. Inside and outside corners.
6. Preservation of air and water tightness at anchors for materials that cover the barrier.
7. Treatment to seal barrier penetrations such as conduits, pipes, electric boxes, and fixtures.
8. Indicate air barrier perimeter, if facility is segmented into areas that are not within the air barrier envelope.

B201004 PARAPETS

Provide parapets for exterior wall construction, where required, for low-slope roofs.

B201005 EXTERIOR LOUVERS & SCREENS

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

B201006 BALCONY WALLS & HANDRAILS

Not used.

B201007 EXTERIOR SOFFITS

Provide factory prefinished aluminum or vinyl panels for exterior soffit system, perforated where appropriate, for all overhanging roof eave soffits.

B201009 EXTERIOR PAINTING AND COATINGS

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

B201010 EXTERIOR JOINT SEALANTS

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

B201011 SUN CONTROL DEVICES (EXTERIOR)

Not used.

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

As much as practical, natural light shall be provided in each area of the building that is regularly occupied, to enhance the working environment, without compromising visual acuity and comfort. Exterior windows are only permitted at private offices and restrooms; additional natural light is to be provided via skylights and/or translucent wall panels. Exterior windows shall be prefinished aluminum or vinyl. Windows shall meet Antiterrorism/Force Protection (ATFP) requirements.

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.

Windows shall be aluminum or steel, fixed. Vinyl clad window assemblies are not acceptable.

Provide integral insect screens for all operable windows.

B202002 STOREFRONTS

Not used.

B202003 CURTAIN WALLS

Not used.

B202004 EXTERIOR GLAZING

Glazing shall be low-e insulating glass units with color to match existing adjacent buildings. Provide obscure glazing at restrooms.

B202090 OTHER EXTERIOR WINDOWS

Not used.

B2030 EXTERIOR DOORS

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

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

Exterior door hardware finish must be stainless steel.

B203001 SOLID DOORS

Provide solid door assemblies including painted prefinished, heavy-duty, non-corroding, doors with frames and hardware. Door openings must receive aluminum thresholds and accessories and wall opening elements such as lintels, closures, sills and flashings as required for weathertight construction.

B203002 GLAZED DOORS

Not used.

B203004 OVERHEAD ROLL-UP AND OVERHEAD SECTIONAL DOORS

Not used.

B203006 BLAST RESISTANT DOORS

Provide special doors used for blast resistance.

B203008 EXTERIOR DOOR HARDWARE

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

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

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

Exterior door hardware finish must be stainless steel.

B203090 OTHER EXTERIOR SPECIALTY DOORS

Provide exterior-mounted sliding doors at Composite Shop areas as indicated. Commercial sliding doors are to be blast resistant, in compliance with Antiterrorism/Force Protection (ATFP) requirements.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

B30 ROOFING

B30 GENERAL SYSTEM DESCRIPTION

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

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

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

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

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

B301001 STEEP SLOPE ROOFING SYSTEMS

Steep slope roofing systems are preferred over low slope roofing systems. Steep slope roofing systems that are acceptable include standing seam metal roof panels.

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. Steel panels must be zinc-coated steel conforming to ASTM A 653/A 653M; aluminum-zinc alloy coated steel conforming to ASTM A 792/A 792M, AZ 55 coating; or aluminum-coated steel.

Provide galvanized sub-purlins for the Structural Metal Roof System.

Structural Standing Seam Metal Roof System (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 the PTS section, and the 20-year Manufacturer's Material Warranties, and the manufacturer's 20-year system weather-tightness warranty.

Provide Specular Gloss of Finished roof surfaces for standing seam metal panels that have a specular gloss value of 10 or less at an angle of 85 degrees.

B301002 LOW SLOPE ROOFING SYSTEMS

Wind Uplift - Provide a complete roof covering assembly rated Class 1-105 or appropriate in accordance with Factory Mutual (FM) P7825, capable of withstanding an uplift pressure of 120 pounds per square foot (with a safety factor of 2 for above deck components) and FM I-49 for perimeter and flashing attachment.

Fire Safety - Provide a complete roof covering assembly:

1. Rated Class A in accordance with ASTM E 108 or FM 4470 or UL 790; and
2. Listed as [part of Fire-Classified roof deck construction in UL Roofing Materials and Systems Directory (RMSD) or Class I roof deck construction in FM P7825c.

Low slope roofing systems that are acceptable include three-ply cold applied modified bitumen roofing and standing seam metal roof system.

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 3-110-03, *Roofing*.

For fastening roof insulation on low-slope membrane roofs, place fasteners to withstand and obtain an uplift pressure of 105 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, splash pans, and sheet metal roofing. Flashings must be Steel Sheet, Zinc-Coated (Galvanized) - ASTM A 653/ A 653M. Galvanized steel items must have a baked-on, factory applied finish of polyvinylidene fluoride or an equivalent fluorocarbon coating.

B301005 GUTTERS AND DOWNSPOUTS

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

B301006 ROOF OPENINGS AND SUPPORTS

Provide insulated roof hatch to access roof top mechanical units.

B301090 OTHER ROOFING

Provide lightning protection.

--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 concrete masonry.

C101001 FIXED PARTITIONS

Provide fixed interior partitions. Sound-rated partition assemblies must have a minimum Sound Transmission Coefficient (STC) as indicated in Chapter 5 "Room Requirements", in accordance with American Society for Testing and Materials (ASTM) E 90 or ASTM E 413 for frequency data.

Internal fire barriers must be provided throughout the new Composite Shop where required by applicable codes and standards. Paint Storage and Paint Mix must be isolated by 2-hour fire barriers. Paint booth must be enclosed in a 2-hour fire rated room and must have 3-foot clearance around the booth per NFPA 33. All 2-hour rated fire barriers must be provided with 1-1/2 hour rated openings, all 1-hour rated fire barriers must be provided with 3/4-hour rated openings.

C101002 DEMOUNTABLE PARTITIONS

Not used.

C101003 RETRACTABLE PARTITIONS

Not used.

C101004 INTERIOR GUARDRAILS AND SCREENS

Not used.

C101005 INTERIOR WINDOWS

Provide interior windows of hollow metal, fixed type. Provide each window as a complete factory-assembled unit with glass factory or field installed.

C101006 GLAZED PARTITIONS & STOREFRONTS

Not used.

C101007 INTERIOR GLAZING

Interior glazing at Layup/Bonding shall be tempered glass. Interior glazing at Machining/Grinding and Clean/Prep must be impact resistant.

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.

All interior doors must be flush.

Metal doors must be factory prefinished. All doors must be prepped and pre-fitted for door hardware.

All interior doors must be wood or hollow metal in hollow metal frames.

Provide STC sound rated door assemblies for doors leading into listed rooms in the RFP Part 5, Room Requirements. Provide a factory tested, insulated, engineered, metal door assembly including door frame, hardware, and seals necessary to achieve the required rating. Install in accordance with manufacturer's instructions.

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

C102002 GLAZED INTERIOR DOORS

Not used.

C102003 FIRE DOORS

Provide interior fire doors.

C102004 SLIDING AND FOLDING DOORS

Provide commercial sliding doors at Composite Shop areas as indicated. Sliding doors are to be configured to allow passage of loaded or unloaded monorail crane system. Insure positive sealing of doors to resist the passage of dust, debris, or paint materials. This is particularly critical at Layup-Bonding Room, to insure that epoxy bonding operations are not contaminated by dust particles from the adjacent Machining/Grinding Room operations.

C102005 INTERIOR OVERHEAD DOORS

Not used.

C102006 INTERIOR GATES

Not used.

C102007 INTERIOR DOOR HARDWARE

Provide hardware, including locks, latches, keys, accessories for all interior doors to satisfy the functional, operational requirements of the rooms and spaces in the project.

Door hardware finish shall be stainless steel.

C102090 OTHER INTERIOR SPECIALTY DOORS

Not used.

C102091 OTHER INTERIOR PERSONNEL DOORS

Not used.

C1030 SPECIALTIES

C103001 COMPARTMENTS, CUBICLES, & TOILET PARTITIONS

Not used.

C103002 TOILET AND BATH ACCESSORIES

Provide brushed stainless steel toilet and bath accessories with thumb latch vs. keyed access where applicable. Provide coat hooks, grab bars, double toilet tissue dispensers (for standard size rolls), paper towel dispensers/disposals, sanitary napkin disposals, grab bars, robe hooks, wall mirrors above lavatories (full width of counter top and minimum 36" high), full height dressing mirrors, soap dispensers at each sink, seat cover dispensers, and high efficiency electric hand dryers. Confirm with Base Janitorial Services what products are provided in their contract to avoid duplication.

C103003 MARKER BOARDS AND TACK BOARDS

Provide marker boards and tack boards as indicated in Chapter 5 "Room Requirements" portion of this RFP. Coordinate with building construction to include appropriate blocking or structural support for the installation of marker boards and tack boards. Marker boards and tack boards are funded as

part of the construction contract.

Tack boards will have anodized aluminum edge trim with colored cork selected from full range of manufacturer's offerings.

White boards will be clear magnetic glass, tempered, back coated white, 1/4" thick with flat polished radius edges; include natural anodized aluminum pen rail mounted to lower edge of board. Include 4 heavy duty magnets, dry erase marker, board cleaner and marker and eraser holder, per board. Board will install with standoff mounts, 1" dia. X 1-1/4"d aluminum.

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

C103005 LOCKERS

Provide lockers as indicated in Chapter 5, "Room Requirements" portion of this RFP. Unless otherwise noted, lockers will be double-tier Z-style lockers, 15"W x 18"D x 72"H on 4" high bases. Lockers must have sloped tops and be installed on manufacturer's bases. Lockers must be high density polyethylene/solid plastic (HDPE), and must include one coat rod and two coat hooks. Provide lockers with standard latching mechanism capable of receiving a standard combination padlock (locks NIC). Lockers are funded as part of the construction contract.

C103006 SHELVING

Built-in fixed shelving is funded as part of the construction contract.

Provide wall-mounted stainless steel utility shelving with heavy-duty shelving supports. Shelving must accommodate a minimum of 300 pounds per shelf.

Provide 8-12" deep wall-mounted stainless steel shelf with mop hooks and heavy-duty supports for janitor closet locations.

Provide heavy duty industrial steel shelving where indicated for shops as indicated in the "Room Requirements" portion of this RFP.

C103007 FIRE EXTINGUISHER CABINETS

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

Note: Fire Extinguishers will be provided as part of the collateral equipment package (FF&E).

C103008 COUNTERS

Not used.

C103009 CABINETS

Not used.

C103010 CASEWORK

Not used.

C103011 CLOSETS

Not used.

C103012 FIRESTOPPING SYSTEMS

Provide all penetrations through rated walls and floors with rated material for firestopping penetrations. All firestopping must be performed by a single experienced firestop contractor. Experienced firestop contractor is defined as following:

1. FM Research approved in accordance with FM 4991, or
2. Operating as a UL Certified Firestop Contractor, or
3. A contractor completed the manufacturer accredited firestop specialty contractor program. Certified, licensed or otherwise qualified by the firestopping manufacturer as having the necessary staff, training, and a minimum of 3 years of experience in the installation of manufacturer's products in accordance with specified requirements. Submit documentation of this experience. 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 installer qualifications on the buyer. Individual building system subcontractors, such as Mechanical, Electrical, Plumbing, Gypsum wall, etc., are not permitted to install firestopping systems.

A single complete submittal including Shop Drawings, Product Data, UL details must be provided for all firestopping systems throughout entire project.

C103013 SPRAYED FIRE-RESISTIVE MATERIALS

Provide sprayed fire-resistive materials to the building's structural framing components as required by Building Code to prevent structural failure.

C103014 ENTRANCE FLOOR GRILLES AND MATS

Building entrances will employ an entry mat system that will have a scraper surface, an absorption surface, and a finishing surface. Each surface will be a minimum of the width of the entry opening, and the minimum length is measured in the primary direction of travel. Comply with ASHRAE 189.1 for specific requirements.

Provide a recessed entry mat system consisting of an aluminum frame with aluminum hinges at building entrances. All carpet inserts must be of nylon construction.

C103015 ORNAMENTAL METAL WORK

Not used.

C103090 OTHER INTERIOR SPECIALTIES

Not used.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

C20 STAIRS

SYSTEM DESCRIPTION

Provide fixed ladder(s) as required by the building code to provide egress as detailed below. Fixed ladder(s) 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 INTERIOR AND EXTERIOR STAIRS

Not used.

C201002 FIRE ESCAPE STAIRS

Not used.

C201090 HANDRAILS, GUARDRAILS, AND ACCESSORIES

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, paint booth rooftop access points 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.

All interior finish products must be from manufacturer's standard running line offerings. Manufacturer's submitted materials must be made available for purchase at NO MINIMUMS for not less than 7 years. Custom fabrications must not be allowed unless otherwise noted.

Finish selections for this project will require the use of wall, floor, and ceiling material accents to enhance the interior design and architecture of the building. Provide an interior finish design scheme that includes a minimum of two different accent colors, to be used throughout the facility. Refer to Part 3, Chapter 6, ESR E20 for Structural Interior Design (SID) requirements and Part 3, Chapter 5, Room Requirements for required locations. Submit floor pattern and accent wall location drawings, indicating proposed interior finish locations with the Structural Interior Design (SID) submittal.

GENERAL SYSTEMS REQUIREMENTS

See Part 3 Chapter 5 "Room Requirements" for specific requirements on "Interior Finishes."

C3010 WALL FINISHES

All interior wall finish materials must be concrete masonry and must be primed and painted. See section C3040 for Interior Coatings.

C301001 CONCRETE WALL FINISHES

All interior wall finish materials must be finished and painted concrete masonry units, unless otherwise indicated in the Part 3, Chapter 5, "Room Requirements" or the concept floor plans in Appendix 1, Part 6.

C301002 PLASTER WALL FINISHES

Not used.

C301003 GYPSUM WALLBOARD FINISHES

Not used.

C301004 CERAMIC AND PORCELAIN TILE WALL FINISHES

Porcelain Tile: Provide through body, impervious, rectified porcelain wall tile, minimum size of 12" x 12" with manufacturer recommended minimum width grout joints. Tile must be minimum Grade B with a wide range of accent colors available. Provide coordinating designer decorative accent strips or coordinating accessory tile shape, minimum Grade D, as an integral part of the wall tile system. Wall tile must extend from the floor to the ceiling. Provide grouted-in stainless steel edge protection strips at all inside and outside corners, stainless steel transition strips where wall tile and floor finish meet, and transitions from tile to other wall finishes.

Provide epoxy grout for all tile installation.

C301090 OTHER WALL FINISHES

Stainless Steel Wall Finishes:

Stainless steel wall panels: Locate behind service and janitor sinks, installed from floor to 48"H. Panels will be Type 304, No. 4 satin finish, 18 gauge, certified USA milled stainless steel wall panels.

C3020 FLOOR FINISHES

Provide floor finish materials to meet the following requirements;

C302001 TILE FLOOR FINISHES

Not used.

C302002 TERRAZZO FLOOR FINISHES

Not used.

C302003 WOOD FLOORING

Not used.

C302004 RESILIENT FLOOR FINISHES

Not used.

C302005 CARPETING

Not used.

C302006 MASONRY & STONE FLOORING

Not used.

C302007 WALL BASE FINISHES

Resinous Flooring: Areas with epoxy resinous floor will have a 6" high integral cove base with 1" radius. Provide stainless steel metal transition strips to be used between epoxy base and porcelain wall tile, where occurring.

Other: Utilize an epoxy based sealant caulking bead where concrete floor meets CMU wall and no other base is required.

C302008 STAIR FINISHES

Not used.

C302009 FLOOR TOPPINGS AND TRAFFIC MEMBRANES

Resinous Flooring Systems: Provide a 3/16" thick, low VOC, decorative resinous floor system consisting of Flake Broadcast style. System must be a troweled mortar system, utilizing epoxy and silica aggregate mortar, high build grout, seal coat, and decorative flake broadcast chip aggregates. Provide coordinating divider strips between each flooring type/color to delineate pattern. Provide flooring surfaces smooth enough to meet the minimum requirements of the RFP or the manufacturer's smoothness requirements, whichever is the most restrictive. Maintain slip resistance with a dynamic coefficient of friction of 0.42, according to ANSI 137.1-2012.

Note: 3/16" thick Decorative Flake Broadcast system is appropriate for use in corridors, offices, workshops, and restrooms.

C302010 HARDENERS AND SEALERS

Not used.

C302011 RAISED ACCESS FLOORING

Not used.

C302090 OTHER FLOORING & FLOOR FINISHES

Concrete Floor Requirements: Finish concrete surfaces smooth enough to meet the minimum requirements of this RFP or the floor finish manufacturer's smoothness requirements, whichever is the most restrictive. Exposed concrete floors that are not required to have an applied floor finish must receive a minimum of three coats of the manufacturer's approved sealer. Finish all concrete floor surfaces as indicated in Part 3, Chapter 5, "Room Requirements" of the RFP. All polished concrete floor surfaces shall be moist-cured, integrally colored and polished to a low gloss level, as required in Part 4 section of this RFP. A dynamic coefficient of friction of 0.42 minimum must be achieved, tested, and documented for all polished interior floor surfaces, as determined by ANSI A137.1-2012. An 8' x 8' mock-up of the polished concrete floor must be produced using the same process that will be used to produce the final polished concrete floor surfaces.

C3030 CEILING FINISHES

Finished surface of ceiling tiles must be selected to address acoustical, maintenance, moisture, or impact resistance requirements of the room.

C303001 ACOUSTICAL CEILING TILES & PANELS

Acoustic Ceiling Panels: Suspended Acoustical Panel System: Primary ceiling finish will be 24" x 24" by 5/8" minimum thickness suspended acoustical panel ceiling system. Acoustical panels will have a square edge. Provide scrubable, fine fissured, panel surface. Select finished surface of ceiling tiles to address acoustical, maintenance, moisture or impact resistance requirements of the room. Minimum requirements are 0.60 NRC and 35 CAC. Provide white color in all spaces unless noted otherwise.

C303002 GYPSUM WALLBOARD CEILING FINISHES

Not used.

C303003 PLASTER CEILING FINISHES

Not used.

C303004 WOOD CEILINGS

Not used.

C303005 SUSPENSIONS SYSTEMS

Provide 24" by 24" aluminum or steel non-corroding intermediate-duty standard grid system for lay-in acoustical panels (ASTM C635). Finish shall be factory applied white baked enamel. Provide manufacturer's hold down clips for fire rated assemblies and wall or edge molding. Hang grid system as recommended by manufacturer but with no less than 0.106 inch diameter wires (ASTM A641A, A641M, Class 1), or with on by 3/16 inch galvanized steel straps conforming to ASTM A653A, A653M (for light commercial zinc coating) or ASTM A366A, A355M (with an electrodeposited zinc coating, Type RS). Use ASTM A580/580M, composition 302 or 304, condition annealed stainless steel, 0.106 inches in diameter over high humidity areas such as commercial kitchens and pools. Install suspended grid system with acoustical sealant (ASTM C843, non-staining and ASTM C636). Recycled content shall be a minimum of 25%.

C303006 METAL STRIP CEILINGS

Not used.

C303009 OTHER CEILING & CEILING FINISHES

Not used.

C3040 INTERIOR COATINGS AND SPECIAL FINISHES

C304001 GENERAL REQUIREMENTS

All finish coatings will be as indicated in the "Room Requirements" portion of this RFP. Paint suitable in accordance with Master Painter Institute (MPI) standards for the interior architectural surface being finished and according to PTS Section C3040 INTERIOR COATINGS AND

SPECIAL FINISHES. All primer and paint systems must be the manufacturer's highest premium quality, professional grade. All materials must be moisture and mildew resistant and easily cleaned.

Spray paint all interior exposed metal and metal surfaces including, such as interior grilles, registers, diffusers, access panels, and panel boxes with a minimum of two coats in color to match adjacent surfaces, unless otherwise indicated.

Include a minimum of three paint colors, including one general and two accent colors throughout the facility. Include a minimum of one accent painted wall per private office. Provide accent painted walls in corridors where insets/offsets occur and to break up long hallway runs.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

D10 CONVEYING

SYSTEM DESCRIPTION

Conveying System includes weight handling equipment.

D1010 ELEVATORS AND LIFTS

Not used.

D101001 GENERAL CONSTRUCTION ITEMS

Not used.

D101002 PASSENGER ELEVATORS

Not used.

D101003 FREIGHT ELEVATORS

Not used.

D101004 WHEELCHAIR LIFT

Not used.

D101005 DUMBWAITERS

Not used.

D101090 OTHER VERTICAL TRANSPORTATION EQUIPMENT

Not used.

D1020 WEIGHT HANDLING EQUIPMENT

Ensure that the crane satisfies the testing and certification requirements detailed in Part 4 of this RFP to the satisfaction of the user activity designated weight handling certifying official. Coordinate witness testing with the user activity designated weight handling certifying official.

D102001 OVERHEAD CRANES

Not used.

D102002 MONORAIL SYSTEMS

Provide a 1-ton rated capacity monorail with a 1-ton rated capacity electric powered hoist/trolley with including service to the concrete apron outside the Machining/Grinding Room, the Machining/Grinding Room itself, Clean/Prep Room, Layup/Bonding Room, Paint Booth Room, self-contained Paint Booth, Paint Booth Room again, and extending onto the concrete apron outside the Paint Booth Room. The clear hook height must not be less than 9 ft. above the finished floor (top of monorail beam at 12 ft. above the finished floor). Provide rail switching capability to insure maximum functional coverage of the shop areas. The monorail must have dual break capability, end stops, wire rope not chain hook system, and lug trolley (which requires less NDT testing).

D1030 ESCALATORS AND MOVING WALKS

Not used.

D103001 ESCALATORS

Not used.

D103002 MOVING WALKS

Not used.

D103003 OTHER MOVING STAIRS & WALKS

Not used.

D1090 OTHER CONVEYING SYSTEMS

Not used.

D109001 PNEUMATIC TUBE SYSTEMS

Not used.

D109002 CONVEYORS

Not used.

D109003 LINEN, TRASH, AND MAIL CHUTES

Not used.

D109004 TURNTABLES

Not used.

D109005 OPERABLE SCAFFOLDING

Not used.

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

GENERAL SYSTEM REQUIREMENTS

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

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 wall mounted flush valve water closets in all public restroom spaces.

D201002 URINALS

Not Used

D201003 LAVATORIES

Refer to Room Requirement Section for the number and type of lavatories required.

Provide countertop lavatories with automatic control in each restroom space.

D201004 SINKS

Refer to Room Requirement Section for the number and type of sinks required.

Provide mop sink in the Janitor's Closet space.

D201005 SHOWERS/TUBS

Not Used

D201006 DRINKING FOUNTAINS AND COOLERS

Not Used.

D201090 EMERGENCY FIXTURES

Provide emergency shower and/or eyewash as indicated in the Room Requirement Section..

Provide tepid water with water tempering valve assembly.

Provide alarms and appurtenances for service within NEMA type 4 enclosures.

D2020 DOMESTIC WATER DISTRIBUTION

Perform a flow test to determine system requirements.

D202001 PIPES AND FITTINGS

Provide Type L Copper tubing and fittings for above ground and Type K Copper for buried piping.

D202002 VALVES & HYDRANTS

Provide isolation valves at supply to each floor. Provide hose bibbs in mechanical room and on the Chiller pad. Provide wall hydrants and/or hose bibbs, along the building exterior such that all points along the perimeter can be reached with a 100 foot (30 meter) long hose and as indicated.

Provide hose bibbs to service rooftop HVAC equipment.

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.

Refer to ESR G30 for water meter requirements.

Provide natural gas fired water heater in the mechanical room for heating of domestic water.

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 as needed to meet Code.

D202004 INSULATION & IDENTIFICATION

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

D202005 SPECIALTIES

Not used.

D202090 OTHER DOMESTIC WATER SUPPLY

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

D2030 SANITARY WASTE

D203001 WASTE PIPE & FITTINGS

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

Provide plastic PVC piping, fittings, and solvent cement for below ground installation.

D203002 VENT PIPE & FITTINGS

Provide plastic PVC piping, fittings, and solvent cement.

D203003 FLOOR DRAINS

Provide floor drains in mechanical rooms, restrooms, shop areas and plumbing chase areas as required.

D203004 SANITARY & VENT EQUIPMENT

Not used.

D2040 RAIN WATER DRAINAGE

D204001 PIPE & FITTINGS

Provide Cast iron hub and spigot pipe and fittings above] ground. Provide PVC piping, fittings, and solvent cement below ground.

D204002 ROOF DRAINS

Provide roof drains that are compatible with the roofing system.

D204004 INSULATION & IDENTIFICATION

Provide the same as domestic water piping.

D204090 OTHER RAIN WATER DRAINAGE SYSTEM

Not used.

D2090 OTHER PLUMBING SYSTEMS

D209001 SPECIAL PIPING SYSTEMS

Obtain natural gas pressures from the local gas utility provider, Virginia Natural Gas, Inc. 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 gas utility provider for installation of piping and appurtenances up to the load side of the meter. Tie the gas meter into the existing Advanced Metering Infrastructure (AMI) metering system.

Refer to ESR G30 SITE CIVIL/MECHANICAL UTILITIES for gas utility locations.

D209002 ACID WASTE SYSTEMS

Not used.

D209003 INTERCEPTORS

Not used.

D209005 COMPRESSED AIR SYSTEM (NON-BREATHING)

Provide air compressor, refrigerated air dryer, after-cooler, and receiver. Provide piping and compressed air drops with quick disconnects throughout the work areas to allow connection of equipment such as paint booth, pneumatic tools and air guns.

D209090 OTHER SPECIAL PLUMBING SYSTEMS

Not used

--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. Refer to Building Requirements, Space Tabulations Section of the Project Program for building occupancy levels.

Provide HVAC system for the Composite Shop with 4-pipe fan coil indoor units, air-cooled chillers, natural gas fired boilers, and dedicated outdoor air system (DOAS). 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. HVAC equipment will operate standalone with factory integral controls.

Economizer cycles are not allowed.

Paint Spray Booth HVAC will be provided under separate sub-contract, and is specified in Section 5 of the RFP, Prescriptive Specification 11 50 10 PAINT SPRAY BOOTH. Coordination between the Paint Spray Booth subcontractor and other construction subcontractors is required to prevent conflicts and overlap.

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:

- a) Conditions (UFC 3-400-02)
 - (1) Location: Naval Station Norfolk – Weather Station 723085
 - (2) Latitude: 36.93° North
 - (3) Longitude: 76.28° West
 - (4) Elevation: 16 feet
 - (5) Climate Zone: 4A
 - (6) Design Temperatures:

Outside Design Conditions:

- (a) Outside Design (cooling 0.4%): 94.1°F DB/75°F MCWB
- (b) Outside Design (heating 99.6 %): 23.8°F db
- (c) Outside Design for OAHU (humidity ratio 0.4%): 142.5 gr/lb/84.1°F MCDB, 77.4 DP

Inside Design Conditions:

- (d) Inside Design (cooling): 75°F DB <60% RH
- (e) Inside Design (heating) 68°F

See Room Requirements for individual space environmental requirements. Provide active humidity control in spaces as indicated.

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

Provide ventilation and exhaust according to UFC 3-410-04 Industrial Ventilation, where applicable.

Configure the HVAC system to provide each zone with the choice of heating or cooling year round. Provide each zone with its own limited range of control.

Zone the HVAC system as follows:

Each space must be a separate zone.

See Part 3 Chapter 5, Room Requirements for individual space environmental requirements.

Provide minimum 4-inch (100 mm) 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 unoccupied mode, provide the following night setback temperatures:

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

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

D3010 ENERGY SUPPLY

D301001 OIL SUPPLY SYSTEM

Not used.

D301002 GAS SUPPLY SYSTEM

Specified in D20 PLUMBING

D301003 STEAM SUPPLY SYSTEM (FROM CENTRAL PLANT)

Not used

D301004 HOT WATER SUPPLY SYSTEM (FROM CENTRAL PLANT)

Not used

D301005 SOLAR ENERGY SUPPLY SYSTEMS

Not used.

D3020 HEAT GENERATING SYSTEMS

Provide a heating system for this facility consisting of 1 boiler.

Provide shot type feeder for manual chemical feed for closed loop system.

D302001 BOILERS

Provide a packaged gas fired condensing hot water boiler.

D302002 FURNACES

Not used

D302003 FUEL-FIRED UNIT HEATERS

Not used

D302004 AUXILIARY EQUIPMENT

Not used

D302005 EQUIPMENT THERMAL INSULATION

Provide insulation for heating system equipment, hot water pumps and other associated heating equipment.

D3030 COOLING GENERATING SYSTEMS

D303001 CHILLED WATER SYSTEMS

Provide scroll air-cooled chiller using a variable primary constant speed pumping system. Provide

chillers with integral electronic compressor speed control for matching dynamic load conditions. Chilled water system shall start, including chiller and distribution pump when outside air temperature is above 55°F for one hour. Chilled water system shall shutdown when outside temperature is below 55°F for one hour.

Provide insulation and vapor barrier on all chilled water equipment.

Provide chiller controls with BACnet communication protocol.

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

D303002 DIRECT EXPANSION SYSTEMS

Provide a dedicated air-cooled direct expansion (DX) ductless split system heat pump unit for the NMCI/Telecom space.

D3040 DISTRIBUTION SYSTEMS

D304001 AIR DISTRIBUTION, HEATING & COOLING

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

Provide grilles, registers, and diffusers. Provide filter grilles for return air.

D304002 STEAM DISTRIBUTION SYSTEMS

Not used

D304003 HOT WATER DISTRIBUTION SYSTEMS

Provide a constant speed pumping system to serve the HVAC hot water equipment throughout the facility.

Provide Type L copper heating hot water supply and return piping to serve the HVAC equipment throughout the facility. Provide Type K copper piping for underground applications. Type M copper is not acceptable for any application on the project. Joints must be soldered using lead free solder. Mechanically crimped joints are not acceptable. Insulate piping with mineral fiber insulation and vapor barrier.

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

Provide an expansion tank for the hot water piping system.

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

D304005 GLYCOL DISTRIBUTION SYSTEMS

Provide as specified for Chilled Water Distribution Systems see D304006.

D304006 CHILLED WATER DISTRIBUTION SYSTEMS

Provide a constant speed pumping system to serve the HVAC chilled water equipment throughout the facility.

Provide Type L copper chilled water supply and return piping to serve the HVAC equipment throughout the facility. Provide Type K copper piping for underground applications. Type M copper is not acceptable for any application on the project. Joints must be soldered using lead free solder. Mechanically crimped joints are not acceptable. Insulate piping with cellular glass insulation.

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

Provide an expansion tank for the chilled water piping system.

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

Provide 30% propylene glycol mixture with automatic glycol makeup tank.

D304007 EXHAUST SYSTEMS

Provide ductwork constructed, braced, reinforced, installed, supported, and sealed in accordance with the IMC and SMACNA standards.

Provide ducted exhaust ventilation systems and exhaust fans to serve all ventilated zones of the facility. Provide in-line or rooftop and ceiling centrifugal exhaust fans.

The Paint Spray Booth exhaust system is specified in Prescriptive Specification 11 50 10 PAINT SPRAY BOOTH.

D304008 AIR HANDLING UNITS

Not used

D304090 OTHER DISTRIBUTION SYSTEMS

Provide constant volume circulating pumps.

D3050 TERMINAL & PACKAGE UNITS

D305002 UNIT HEATERS

Not used

D305003 FAN COIL UNITS

Provide 4-pipe type fan coil units and controls to serve the heating and cooling requirements of the facility. Provide one fan coil unit for each zone and located in the overhead or on the mechanical room floor if serving adjacent spaces. Allow adequate space for maintenance. Provide each fan coil unit with a return filter grille to ease maintenance requirements. Provide auxiliary drain pans below valves and appurtenances to prevent piping leaks and condensate forming on chilled water piping from damaging ceilings.

D305004 FIN TUBE RADIATORS CONVECTORS

Provide fin tube radiators or convectors for heating in restroom spaces.

D305005 ELECTRIC HEATING

Not used

D305006 PACKAGE UNITS

Provide 100 percent Outside Air Makeup Air Conditioning Units to precondition outside air prior to distributing to space fan-coil units.

D3060 CONTROLS AND INSTRUMENTATION

D306001 HVAC CONTROLS

D306001 1.1 DIRECT DIGITAL CONTROLS (DDC)

HVAC equipment shall operate by standalone factory integral controls.

D306001 1.2 ELECTRONIC CONTROLS

Provide electronic controls with programmable thermostats for the HVAC systems and equipment. Provide active cooling coil dehumidification sequence in spaces with humidity criteria noted in the Rooms Requirements. Cycle cooling coil and heating coil to prevent over cooling the space when in dehumidification mode.

D3070 SYSTEMS TESTING AND BALANCING

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

D307003 HVAC COMMISSIONING

Not Used

D3090 OTHER HVAC SYSTEMS AND EQUIPMENT

D309001 GENERAL CONSTRUCTION ITEMS

Provide access to the mechanical equipment rooms through double width doors on the building exterior walls.

D309090 OTHER SPECIAL MECHANICAL SYSTEMS

Provide industrial ventilation system in accordance with UFC 3-401-01.

Provide HVAC and controls for the Paint Spray Booth according to Prescriptive Specification 11 50 10 PAINT SPRAY BOOTH in Part 5 of the RFP.

Provide heat pipe energy recovery for the Paint Spray Booth system only. Wheel type heat recovery

is not acceptable. Provide cooling coil dehumidification sequence. Wheel type humidity control is not acceptable.

-- 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 suppression system capable of notifying building occupants and controlling any fire that may start inside the facility.

GENERAL SYSTEM REQUIREMENTS

Provide working space around all equipment. Provide concrete pads under all equipment. Provide all required fittings, connections and accessories required for a complete and usable system. 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). A Qualified Fire Protection Engineer is defined as a registered Professional Engineer (P.E.) who has passed the fire protection engineering written examination administered by the National Council of Examiners for Engineering and Surveys (NCEES).

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 SYSTEM

Provide an integrated fire alarm, system capable of notifying building occupants inside the facility. Provide a complete, electrically supervised, addressable intelligent, manual and automatic, annunciated fire alarm and detection system throughout the facility. Provide a voice evacuation type system. Provide integrated systems capable of notifying building occupants by means of tones, strobes, prerecorded and live voice announcements.

The fire reporting portion of the system must be compatible with the existing base fire reporting system. Naval Station Norfolk uses a telegraphic system connecting through the 100mA Gamewell loop. Provide a Digitize DET-16 transmitter to communicate with the base wide Digitize equipment.

Provide a complete and useable fire alarm system including manual stations, system smoke

detectors, duct smoke detectors, carbon monoxide detectors (multi criteria detectors prohibited), audio/visual alarms, 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 B Notification Appliance Circuits, Class B Signaling Line Circuits, and Class B Initiation Device Circuits.

Provide surface mounted manual pull stations.

Provide a remote annunciator located at main entrance.

D4020 FIRE SUPPRESSION WATER SUPPLY AND EQUIPMENT

Water Flow Test Data for Reference and bidding purpose only. A static pressure of 68 psi and a residual pressure of 58 psi at 1190 gpm were measures on November 30th, 2021. The static hydrant ID is #3125 and the flow hydrant ID is #3252.

Base hydraulic calculations at the junction with the water distribution piping system. The water supply information provided in the RFP is for bidding purpose only. The project FPDOR must conduct additional water flow tests after the contract award for design submissions and shop drawing submittals. Water flow test must be conducted at about the same time of the day as indicated in the Gov't flow test data..

Provide the incoming sprinkler service with a reduced pressure principle backflow preventer

D4030 STANDPIPE SYSTEMS

Not used.

D4040 SPRINKLER SYSTEMS

Provide wet automatic sprinkler protection to provide complete coverage throughout the facility.

For ordinary hazard areas the sprinkler rate of application must be 0.2 gpm/ft², over an area of 2500 ft² with hose stream allowance of 250 gpm.

For the Paint Booth Room the sprinkler rate of application must be 0.3 gpm/ft², over the area of the room with a hose stream allowance of 500 gpm (a 2-hour fire rating is required around this room allowing for the design area to be the limits of the room).

Provide quick-response sprinklers with ordinary temperature rating in areas with finished ceilings. Provide corrosion resistant sprinklers for paint booth room.

D4090 OTHER FIRE PROTECTION SYSTEMS

Not used.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

D50 ELECTRICAL

SYSTEM DESCRIPTION

This project includes the construction of buildings and structures as listed below. Refer to site plans for building locations.

Provide an interior electrical system consisting of Service Entrance Wiring and Equipment, Distribution Panelboards, Dry Type Transformers, Conduits, Feeder and Branch Circuits, Lighting and Branch Wiring, Communications Systems, Emergency Lighting and Power, Grounding, 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 each building with a single utility service with radial power distribution.

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

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

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

GENERAL SYSTEM REQUIREMENTS

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

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

SUSTAINABILITY

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

ANTITERRORISM

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

SEISMIC BRACING

Bracing of electrical equipment to resist seismic events is 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, Section 01 33 29.05 20 *Sustainability Reporting for Design Build*, Section 01 91 00.15 *Total Building Commissioning*, and UFC 1-200-02 *High Performance and Sustainable Building Requirements*.

D5010 ELECTRICAL SERVICE AND DISTRIBUTION

D501001 MAIN TRANSFORMERS

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

D501002 SERVICE ENTRANCE EQUIPMENT

Provide underground service into the facility.

Provide a main distribution panel as service equipment. Provide with digital metering.

D501003 INTERIOR DISTRIBUTION TRANSFORMERS

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

D501004 PANELBOARDS

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

D501005 ENCLOSED CIRCUIT BREAKERS

Provide enclosed circuit breakers for all HVAC and government furnished equipment that requires a direct connection to power.

D501006 MOTOR CONTROL CENTERS

Not used.

D501090 OTHER SERVICE AND DISTRIBUTION

Not used.

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. General purpose receptacles located in Paint & Epoxy Storage and Mixing and Shop areas shall be quadruplex receptacles and spaced every 10'.

Provide dedicated circuits and connections for equipment outlined in the Room Requirements Form. Coordinate location and mounting height with customer.

D502001 BRANCH WIRING

Provide insulated conductors in conduit branch wiring. RGS conduit with a minimum of 3/4" diameter shall be used in mixing areas & shops. EMT shall be permitted in other areas.

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. Occupancy and vacancy sensors shall not be used in mixing & shop areas.

D5030 COMMUNICATIONS AND SECURITY

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

D503001 TELECOMMUNICATIONS SYSTEMS

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

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

Provide remote telephone ringer and strobe in each shop area tied back to office telephone to notify shop personnel of incoming calls.

D503002 PUBLIC ADDRESS SYSTEMS

Provide a Public Address system with speakers in all common spaces and a master station in the office.

D503003 INTERCOMMUNICATIONS SYSTEMS

Not used.

D503004 TELEVISION SYSTEMS

Not used.

D503005 SECURITY SYSTEMS

Not used.

D503006 INDUSTRIAL CONTROL SYSTEMS (ICS)

Not used.

D503090 OTHER COMMUNICATIONS AND ALARM SYSTEMS

D503090 1.1 REMOTE TELEPHONE NOTIFICATION SYSTEM

Provide a remote telephone notification system in all shop areas capable of producing audio/visual notification of incoming phone call on telephone line installed in office.

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 ballasts in conjunction with normal lighting fixtures for emergency lighting.

In non finished spaces, use stand alone emergency lighting units for emergency lighting.

D509003 GROUNDING SYSTEMS

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

D509004 LIGHTNING PROTECTION

Provide a risk assessment in accordance with NFPA 780 Annex L, Section L-5, Simplified Risk Assessment. If lightning protection is required, provide an LPS in accordance with NFPA 780 criteria, using components manufactured in accordance with UL 96. Due to presence of flammable materials, need for protection should be given serious consideration regardless of the outcome of the risk assessment. Ensure system meets requirements outlined in UFC 3-575-01 Lightning and Static Electricity Protection Systems

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. Coordinate connection requirements with service entrance energy monitoring equipment.

D509007 PHOTOVOLTAIC ENERGY SYSTEM

Not used.

D509090 OTHER SPECIAL SYSTEMS AND DEVICES

D509090 1.1 400 HERTZ SYSTEMS

Not used.

D509090 1.2 STATIC ELECTRICITY PROTECTION SYSTEM

Identify hazardous classified locations in accordance with NFPA 70. Provide grounding and bonding for these areas in accordance with NFPA 77 to support the intended operations.

Include a listing of hazardous materials, containers, and operating units in the design, and indicate fixed operating equipment locations on the drawings. Identify portable and movable equipment requiring static electricity grounding distinctively by location and with type of grounding method each location requires.

Ensure system meets requirements outlined in UFC 3-575-01 Lightning and Static Electricity Protection Systems

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

E10 EQUIPMENT

GENERAL SYSTEMS REQUIREMENTS

E1010 COMMERCIAL EQUIPMENT

Obtain the services of equipment specialists to specify audiovisual, shop, and 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.

Provide seismic restraints for all floor mounted or suspended equipment, and architectural components in accordance with the IBC and ASCE 7-16. Seismic design parameters must be based on site specific geotechnical information and recommendations.

The Composite Shop must also comply with the UFC 4-010-01 requirements for equipment bracing and overhead mounted architectural features.

E101003 VENDING EQUIPMENT

Not used.

E101005 SECURITY AND VAULT EQUIPMENT

Not used.

E1020 INSTITUTIONAL EQUIPMENT

E102003 LABORATORY EQUIPMENT

Not used.

E102009 AUDIOVISUAL 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. Equipment will remain under the control of the Government until such time as the Contractor is ready to install. Provide 30 days advance notice of expected installation date and the User will install in the new facility. 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: Tiger Vac Air with filtration system, Clayton Pneumatic system, PAPCE Arm Vacuum system, Material/Fabric Rack.

E1090 OTHER EQUIPMENT

Specialty Equipment: Furnish and install one self-contained paint booth, including all required ventilation, filtration, and automated curing capabilities. Contractor must provide and install a maintenance access stair to include an equipment platform. Doors to the paint booth must have the ability to swing and allow passage of the monorail crane system at both ends. Minimum interior workspace dimensions are 12'-0" wide x 26'-0" long x 12'-0" high.

E109002 FOOD SERVICE EQUIPMENT

Not used.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

E20 FURNISHINGS

SYSTEM DESCRIPTION

Furnishings must include fixed furnishings as part of the Structural Interior Design (SID) and the design and documentation of the movable furnishings, the Furniture, Fixtures, and Equipment (FF&E) Package and Audio/Visual (A/V) Equipment 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 Government FF&E budget on the Bid Schedule/Price Proposal Form is estimated in the following amount: \$207,346.86. This estimate does NOT include the Contractor's Handling and Administration Rate (HAR). The Government FF&E budget must not be altered by Contractor's during the bid process.

Fixed furnishings (items that are fixed to the structure), such as specialty equipment, lockers, fixed shelving, fixed display furnishings, and 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 a planned modification. The A/V Package must include shipping, freight, handling, installation, applicable state sales tax, and the Prime Contractor's A/V Handling and Administration Rate (HAR) percentage as applied to the final A/V total cost. Refer to Part 3 Section E10 of this RFP for further information, including the Government A/V budget.

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) and other portions of this RFP to provide a fully usable and complete facility. Design a complete FF&E package and prepare supporting plans and procurement data. The design, procurement, and installation of the A/V package must comply with all of the same requirements as those defined for the FF&E package in this specification section. FF&E and A/V 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) (i.e. Youth center, BEQ) and in conjunction with UFC 03-120-10, *Interior Design*.

The contractor must retain 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, locality and/or jurisdiction Interior Design Certification, Registration, or License. This Interior Designer must prepare both the Structural Interior Design (SID) and the FF&E Package and attend and participate, in entirety, all kick-off meetings, existing site visits, design meetings, to include, but not limited to: design charrettes, concept design workshops, and review meetings to develop the building design, floor plan,

and the FF&E package.

When Audiovisual (AV), shop or specialty equipment is required in the project, the Contractor must obtain the services of the appropriate equipment specialists to specify the AV, shop, or specialty equipment. The NAVFAC approved Specialist(s) must provide separate Best Value Determinations (BVDs) for this equipment, if required by NAVFAC.

A Certified Technology Specialist-Design (CTS-D) is required for the design and preparation of A/V packages. The CTS-D must attend and participate, in entirety, all design meetings, to include, but not limited to, design charrettes, concept design workshops, presentations and review meetings to develop the floor plan and the A/V package.

The Contractor's Interior Designer and CTS-D, the Design Firm Owner(s), and any Specialists must not have any affiliation with the products specified. The NAVFAC Contracting Officer reserves the right to approve/disapprove the qualifications of the Contractor's Interior Designer based upon review/recommendation of the NAVFAC Interior Designer per UFC 3-120-10, the FF&E includes the design, selection, specification, color coordination and procurement documentation of the required items necessary to meet the functional, operational, sustainability, and aesthetic needs of the facility.

FF&E specifications must be based on NAVSUP Blanket Purchase Agreements (BPA's), GSA schedules, and other Federal contracts and complying with priorities found in FAR Part 8.404. The utilization of the current NAVSUP BPA list is required for BVD Analysis Request for Pricing. The current NAVSUP BPA list is located at <http://www.wbdg.org/ffc/navy-navfac/collateral-equipment>.

The A/V package must be prepared by the A/V CTS-D, must provide a separate Best Value Determinations (BVDs) for the A/V equipment. The Specialist must provide A/V floor plans indicating equipment locations and A/V riser diagrams for all A/V systems and coordinate equipment locations and power requirements with power plans. The Final FF&E and A/V packages must utilize the most current generation technology. All fixed and movable furnishings and A/V selections and designs must be closely coordinated with Parts 3 and 4 Sections C10, C30, E10, D50, and all other parts of this RFP. All fixed and movable furnishings and A/V must be fully integrated with the final design, to include all building finishes, and all building systems (HVAC, Plumbing, Fire Protection, Communications, Electrical, Data, Architecture, etc.), construction and schedule. All outlets, switches, thermostats, etc. must be fully accessible. All sprinkler heads, fire extinguishers, ADA, etc., clearances must be accommodated. The Contractor's Interior Designer and equipment specialists must be responsible for designing and providing specifications for procurement of all FF&E, A/V and specialty equipment, to include delivery and installation, for the facilities built under this contract as directed by the NAVFAC Interior Designer.

The Prime Contractor is responsible for all A/V, communications, data, and power cabling required for installation within systems and freestanding furniture and for performing final connections to the building. The FF&E and A/V packages must be fully integrated into the design and construction schedule for the building. All submittal due dates for the SID, FF&E and A/V must be reflected in the Contractor's construction schedule. **The Contractor and the Contractor's Interior Designer must strictly adhere the FF&E submittal schedule defined prior to the 35% design development to ensure that the final FF&E package is submitted at least 3 months prior to FF&E funding deadlines and no later than 9 months prior to building completion.** Requests to change the SID or FF&E schedule must be submitted to the NAVFAC Interior Designer for review/recommendation and approved by the NAVFAC Contracting Officer.

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 UFGS Section 01 33 10.05 20, *Design Submittal Procedures*.

The Contractor's Interior Designer must document and submit minutes of all meetings and phone calls to the NAVFAC Interior Designer within 7 days of each occurrence.

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 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 and CTS-D must conduct in-depth room by room interviews to confirm Activity requirements (SID, FF&E, A/V, etc.) for the new facility(s). These interviews must occur during the CDW and will include building walk-thru(s) at the Activity's current location and/or similar facility(s), if possible.
- 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, FF&E Summary List, and a preliminary Cost Estimate 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 three (3) options for the interior building finishes/colors/materials. Manufacturer choices and cost range of materials must be pre-approved by the Contractor to prevent any substitutions during the submittal process. Finish option samples for NAVFAC review must be clearly labeled and in a "loose" format for preliminary approval prior to the presentation to the Activity. Options must include manufacturer's label/specifications/data sheets. The over-the-shoulder review meeting must be held at NAVFAC, located in Norfolk, VA or via conference call.
- d. SID Presentation to Activity: The Contractor's Interior Designer must present a minimum of two (2) NAVFAC Interior Designer-approved options for the interior building finishes/colors/materials to the Activity for approval. Finishes must display manufacturer's label/specifications and be presented in a "loose" format for approval. The meeting must be held at the Activity's location at Naval Station Norfolk. Photos documenting the selected finish option and preliminary finish schedule for that option must be emailed to the NAVFAC ID within 7 business days. The NAVFAC Construction Manager, Project Manager, and the Interior Designer must be invited to this meeting.
- e. Prefinal (100%) Submittal: The Contractor's Interior Designer must submit the Activity-approved interior building finishes/color/material selections. These drawings and all approved finishes must be submitted in 8-1/2" x 11" binder format, using heavy duty plastic sheet protectors. Mount finishes to heavy duty card stock.

Three (3) sets of the Prefinal SID Binder Submittal must be documented and submitted for review and approval as follows: (1) NAVFAC Project Manager/Interior Designer, (2) for the Construction Manager and the Activity, and will include the following:

1. Updated Furniture and Equipment Plan
2. Floor Finish Plan(s) w/ floor patterns and accent wall locations
3. Finish Legend

4. Finish Schedule
5. Pre-Final Finish Selections and Physical Samples (photocopies of samples are not acceptable.)
6. CD copy of submittal in binder

The Contractor's Interior Designer must provide at least two (2) sketches to show perspectives of the major areas of the interior. The sketches should not be elaborate but must show the proposed form and massing, colors to be used and an indication of materials used.

- f. 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. Mount finishes to heavy duty card stock.

Three (3) sets of the Prefinal SID Binder Submittal must be documented and submitted for review and approval as follows: (1) NAVFAC Project Manager/Interior Designer, (2) for the Construction Manager and the Activity, and will include the following:

1. Updated Furniture and Equipment Plan
2. Floor Finish Plan(s)
3. Finish Legend
4. Finish Schedule
5. Final Finish Selections and Samples
6. CD copy of submittal in binder
7. 1 set of 16"x20" presentation boards

STRUCTURAL INTERIOR DESIGN (SID) CONSTRUCTION SUBMITTALS

No substitutions must be made to the SID finishes once they have been approved by NAVFAC during the design phase. In the event that revisions may be required due to unforeseen conditions such as discontinued product, such revisions must be submitted to the FEAD and NAVFAC Interior Designer for approval by the NAVFAC Interior Designer before substitutions can be made.

FIXTURES, FURNISHINGS AND EQUIPMENT and AUDIO VISUAL (FF&E and A/V)

The FF&E and A/V design process must begin at the CDW and develop concurrently with the building design. The submittals shall include fixtures, furnishings, and equipment specifications in accordance with the Activity requirements to produce an optimally functional facility. FF&E are all items that are not fixed to the structure, but are fully integrated with the floor plan, building systems, and finishes. Refer to RFP Part 4 Section Z10 General Performance Technical Specification and Part 2 UFGS Section 01 33 1-.05 20, Design Submittal Procedures.

Develop design as described and in accordance with the Activity requirements. Include in the design all loose furnishings required to produce an optimum functional facility, consistent with quality commercial design. This project also includes the preparation of specific detailed information for each selected item. Each submittal must demonstrate thorough interaction with the Activity requirements and complete coordination with the facility design and the SID.

The Activity will supply the Contractor's Interior Designer and CTS-D with a complete list of all existing FF&E and A/V, to include sizes, utility requirements, weight, etc., to be relocated to the new facility. Provide the FF&E relocation phasing plan/schedule, and identify the party(s) responsible for storage, logistics, and re-installation of existing FF&E, as required. Incorporate the existing FF&E and A/V into the FF&E and A/V plans.

For all projects, including fast track projects, the Contractor must be responsible for sufficiently scheduling all SID/FF&E and A/V submittals early enough to obtain the required government approvals, and meet all ordering and installation lead times to complete the project by the contract completion date.

These are minimum requirements and the Contractor must be prepared to provide any/all additional meetings and submittals that may be necessary to support the Interior Design effort/FF&E and A/V coordination. The Contractor's Interior Designer and CTS-D must document and submit minutes of all meetings and phone calls to the NAVFAC Interior Designer and Electrical Engineer within 7 days of each occurrence.

Provide the following FF&E and A/V meetings and submittals;

- a. FF&E and A/V Procurement Requirements Meeting (Interior Design Orientation): This meeting must occur at the CDW and/or via conference call prior to the Design Development (35%-50%) Submittal and the development of the FF&E package. The NAVFAC Interior Designer and NAVFAC Electrical Engineer will provide the Contractor's Interior Designer and CTS-D current sample documents to be used for the FF&E and A/V BVD Analysis solicitation package and submittals, review the Best Value Determination (BVD) process, discuss the number of Best Value Determinations required and discuss Blanket Purchase Agreement (BPAs), GSA or other mandatory sources to consider.
- b. FF&E "Over the Shoulder" Review: Prior to the FF&E Concept Presentation and Best Value Determination (BVD) Analysis, the Contractor's Interior Designer and CTS-D must meet with the NAVFAC Interior Designer and NAVFAC Electrical Engineer for an "over-the-shoulder" review to present a minimum of two preliminary FF&E options and to discuss A/V options. These can be presented in a "loose" format for preliminary approval prior to the Activity presentation. The "over-the-shoulder" review meeting must be held at NAVFAC MIDLANT, located in Norfolk, VA or via conference call.
- c. FF&E and A/V Concept Presentation: The Contractor's Interior Designer and CTS-D must present the NAVFAC approved preliminary FF&E and A/V package to the Activity for approval. This presentation must include loose format samples and catalog cuts. Sample boards are not required. This meeting must occur in conjunction with the SID presentation to the Activity, if possible. The NAVFAC Construction Manager, Project Manager, the Interior Designer and Electrical Engineer must be invited to this meeting.
- d. Best Value Determination (BVD), "Over the Shoulder Review": Prior to issuing the BVD Analysis solicitation package, the Contractor's Interior Designer and CTS-D must send an electronic copy and a hard copy in binder format, of the complete FF&E BVD Analysis solicitation packages to the NAVFAC Interior Designer and the complete A/V BVD Analysis solicitation package to the NAVFAC Electrical Engineer for review. The Contractor's Interior Designer and CTS-D must meet with the NAVFAC Interior Designer and NAVFAC Electrical Engineer for an "over-the-shoulder" review of all required solicitation packages and to review the most current NAVSUP BPA vendor list for FF&E vendors and discuss GSA Contract Audio Visual vendors. The "over-the-shoulder" review meeting must be held at NAVFAC MIDLANT, located in Norfolk, VA or via conference call. Separate solicitations are required for each FF&E BPA category and the A/V

package.

BVD Analysis Solicitations must include the following:

1. Copy of the BVD Analysis Request for Pricing cover letter – Indicate all revisions to this NAVFAC-provided template utilizing "Track Changes." NAVFAC approved revisions may be added to this document, but no items may be deleted.
2. BVD Analysis Request for Pricing Spreadsheet/Questionnaire with "basis of design" item product numbers, photos & descriptions
3. Detailed Technical Specifications/Criteria developed for each item in NAVFAC MIDLANT's standard format to establish minimum acceptable requirements for comparable bids.
4. Project Specific Room and/or Furniture Typicals
5. Furniture/ A/V Plans with Legends coded to the BVD Analysis RFP (PDF format)
6. Contractor's subcontract agreement/terms and conditions (if applicable)
7. Note: Contractor's Interior Designer must refer to the Whole Building Design Guide for the most current BPA Contract Holder vendor information prior to sending out the bid solicitations, located at:
<http://www.wbdg.org/ffc/navy-navfac/collateral-equipment>

- e. BVD Submittal and "Over the Shoulder" Review - The Contractor's Interior Designer CTS-D must submit one (1) hard copy in binder format of the BVD package to the NAVFAC Interior Designer and the NAVFAC Electrical Engineer. An electronic copy must be sent to the NAVFAC Contracting Officer. Additional back-up information from specific bid packages may be requested on an as-needed basis. The "over-the-shoulder" review meeting must be held via conference call to review the results of the solicitation and determine a best value recommendation. Submit the following in 3-ring binders and include a CD copy in each for review and approval:

The BVD Submittal must include the following:

1. Cover Title Page (project name, project #, location, submittal date, submittal title)
2. Table of Contents
3. Point of Contact List
4. Narrative of Package Objectives
5. Copy of all information sent to bidders and documentation that all required sources were contacted
6. BVD Analysis Request for Pricing Spreadsheet/Questionnaire completed by each bidder
7. Back-up Information submitted by each bidder (cut sheets/highlighted pricing sheets/technical specifications, pricing, dealer and manufacturer qualification for each product showing that products meets all requirements.)
- 8 Responses from UNICOR (FF&E package only)

9. Completed BVD Analysis Pricing Evaluation Spreadsheet comparing bidder quotes/responses

10. Contractor's recommendation for the Best Value vendor and justifications

11. CD copy of the FF&E and A/V BVD Submittal binders.

- f. Preliminary FF&E and A/V Submittals: The Preliminary submittals must be due at pre-final (100%). Preliminary selections must be presented to the Activity and NAVFAC Interior Designer, and NAVFAC Electrical Engineer, in loose format at a meeting to occur at the Activity's location at Naval Station Norfolk. Immediately following this meeting, the Preliminary FF&E and A/V submittal binders must be submitted.

Three (3) submittals must be documented and submitted for review and approval as follows:

(1) NAVFAC Project Manager/Interior Designer, (2) for the Construction Manager and the Activity, and will include the following:

Submit the following in a 3-ring binder for review and approval:

The Preliminary FF&E and A/V Submittals must include the following:

1. Cover Title Page (project name, project #, submittal date, submittal title)
2. Table of Contents
3. Point of Contact List (includes contact info for recommended vendors and subcontractors)
4. Preliminary FF&E and A/V lists - (Cost Summary) to include shipping, freight, handling, professional installation, project management, HAR and applicable sales tax
5. Preliminary Procurement Data Spec Sheets completed for each product. Indicate general appearance as well as proposed finish and/or fabric selections
6. Furniture and/or A/V placement plans coded to the FF&E and/or A/V lists and Procurement Data Spec Sheets
7. Technical Specifications used in bid request for all furniture, and A/V, etc.
8. Preliminary Finish and Fabric Selections and Samples in 8 x 10 binder format mounted on heavy-duty card stock in edge-reinforced heavy-duty plastic sheet protectors. (For FF&E only)
9. Copy of Quote(s)/Bill of Materials (BOM) on letterhead from the vendor(s) determined to be the Best Value. Code BOM line items to the Cost Summary Item Codes. Indicate and provide explanations for all changes to FF&E or A/V quantities and/or pricing that occur between accepted vendor proposal and Final FF&E Submittal

- g. Final FF&E and A/V Submittal: The Contractor's Interior Designer must submit the Final FF&E and A/V Packages within 30 calendar days following the receipt of review comments on the preliminary FF&E and A/V submittals. All required documentation revisions of price changes and product reselection due to price increases or discontinued product must be the responsibility of the Prime Contractor's Interior Designer / CTS-D.

Three (3) submittals must be documented and submitted for review and approval as follows:

(1) NAVFAC Project Manager/Interior Designer, (2) for the Construction Manager and the Activity, and will include the following:

The Final submittal must include the following:

1. Cover Title Page (project name, project #, submittal date, submittal title identified on binder cover and spine)
 2. Table of Contents
 3. Manufacturer Point of Contact List (includes contact info for recommended vendors and subcontractors)
 4. Final FF&E and A/V lists (Cost Summary) to include shipping, handling, freight, professional installation, project management, HAR and any applicable sales tax.
 5. Final Procurement Data Spec Sheets completed for each product. Indicate final finish and fabric selections
 6. Final Furniture and A/V Placement Plans coded to the FF&E and A/V lists, Procurement Data Sheets and specifications
 7. Final Finish Selections and Memo Samples submitted in 8 x 10 binder format, mounted on heavy-duty card stock, using heavy-duty plastic sheet protectors. (For FF&E only)
 8. Copy of Final Quote(s)/Bill of Materials (BOM) on letterhead from the vendor(s) determined to be the Best Value. Code BOM line items to the Cost Summary Item Codes
 9. Best Value Determination Guidelines sheets (completed and signed by the Contactor's Interior Designer and CTS-D)
 10. CD copy of the final FF&E and A/V binders
 11. (1) set of 24" x 36" FF&E presentation boards
- h. Punch List: The Contractor's Interior Designer (and A/V consultant or other specialty consultants, if applicable) must attend two punch list site visits with the installation dealer(s), NAVFAC Interior Designer and the Base Representative/Activity Contact. The first site visit must identify all punch list items (at installation dealer's 98% completion), and the second (at 100% completion) will confirm that all punch list items have been resolved.

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 FF&E to include seating, systems furniture and keyboard trays, as well as all A/V items.

E2010 FIXED FURNISHINGS (SID)

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

Develop design as described herein and provide storage shelving, equipment racks, and window treatments. Cross reference C10 Interior Construction, and C30 Interior Finishes, for performance requirements. Each submittal must demonstrate complete coordination with the facility design and with the package for movable furnishings.

E201001 FIXED ARTWORK

Not used.

E201002 WINDOW TREATMENTS

Provide 3% light filtering manually operated single or double-roller sunscreen with room darkening shade at all windows and other glazed openings to the exterior of the building. Provide double-roller shades for all spaces where A/V occurs. Determine blind type by level of privacy needed within the space. Provide 1" horizontal blinds at all interior windows.

These fixed window treatments are considered SID and are funded as part of the construction project. Soft window treatments, such as valances, cornices, draperies, and blackout systems are considered FF&E and must be included in the FF&E package, as required.

E201003 FIXED SEATING AND TABLES

Not used.

E201004 INTERIOR LANDSCAPE (FIXED)

Not used.

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, and applicable sales tax.

A Best Value Determination must be performed on a minimum of three manufacturers and UNICOR for orders exceeding the micro-purchase threshold from an individual manufacturer/vendor. Multiple BVDs may be required in order to complete the final FF&E and A/V packages. The required quantity of BVDs to be performed will be determined by the NAVFAC Interior Designer during the design phase and is dependent on the appropriate NAVSUP BPA category(s) to be utilized and specific project requirements. Documentation must be provided 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. Sample BVD forms and instructions will be reviewed during the FF&E Procurement Requirements Meeting. Forms can be obtained from the WBDG at <http://www.wbdg.org/ffc/navy-navfac/collateral-equipment>.

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. The Contractor must establish and submit a fixed percentage figure, for the administration effort of this modification (HAR), with the initial project proposal as part of the Contractor's Pricing Schedule.

E202001 MOVABLE ARTWORK

Provide movable artwork as required, including squadron logos; include Chain of Command board(s).

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 and guest seating, storage and filing, and tables, as required.

E202004 RUGS & ACCESSORIES

Not used.

E202005 MULTIPLE SEATING (MOVABLE)

Not used.

E202006 INTERIOR LANDSCAPING (MOVABLE)

Not used.

E202090 OTHER MOVABLE FURNISHINGS

Provide waste receptacles, recycling containers, fire extinguishers, clocks, and other appliances as required.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

F10 SPECIAL CONSTRUCTION

Not Used.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

F20 SELECTIVE BUILDING DEMOLITION

Not Used.

--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 was performed in October/November 2021 and is included in Part 6. The topographic survey has been provided to show the location of existing facilities, areas of new work required by this RFP and the character of the sites. 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 obtained permits.

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.

GEOTECHNICAL SITE EARTHWORK CONSTRUCTION REQUIREMENTS:

Site preparation shall be in accordance with the Contractor's Geotechnical Engineer 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 proofrolling of the pavement and building pad 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 building pad 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.

G101002 TREE REMOVAL

Remove and dispose of existing pine tree only if required for project construction.

G101003 STUMP REMOVAL

Not used.

G101004 GRUBBING

Not used.

G101005 SELECTIVE THINNING

Not used.

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

No items are to be reused or relocated.

G102001 BUILDING MASS DEMOLITION

Not used.

G102002 ABOVEGROUND SITE DEMOLITION

Preserve the following aboveground site elements: Bldg SP302, bollards protecting building entrance of SP302, gas meter serving SP302, PIV serving SP302, bollards protecting gas meter and PIV, chain link fence that can remain during construction.

Completely remove the existing aggregate base materials within the areas where the existing asphalt pavement is demolished. Take care not to mix the existing aggregate base materials with the underlying soils during removal operations. Existing aggregate base materials which are mixed with onsite soils are considered unsatisfactory and must be disposed of by the Contractor at a permitted licensed disposal facility. Use the reclaimed aggregate base material to backfill excavations resulting from the demolition of existing utilities/foundations as well as new utility/ foundation excavations within the planned building and pavement areas.

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: 12" DIP fire submain serving the FRC Compound, 8" DIP fire service line serving SP302, 8" DIP domestic water main and 4" DIP domestic service line serving the FRC Compound and associated water meter vault (unless replacement is required to satisfy proposed water usage with Composite Shop), electric and communications ductbanks and conduits.

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.

G102003 1.1 UNDERGROUND STORAGE TANKS

The project site may require removal of an abandoned underground wash water storage tank if encountered during earthwork operations, foundation excavations, and utility excavations.

G102004 BUILDING RELOCATION

Not used.

G102005 UTILITY RELOCATION

Relocate utilities as indicated on the drawings in Part 6.

G102006 FENCING RELOCATION

Not Used.

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*.

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.

G102090 OTHER SITE DEMOLITION & RELOCATIONS

Following approval from the Contracting Officer, remove unknown buried abandoned debris (concrete, piping conduit, railroad tracks, etc) that may be encountered during earthwork operations, foundation excavations, and utility excavations, where necessary to complete the contractor work. Properly dispose of all removed debris off the Government property. Backfill the excavations made to remove debris with compacted select fill material. Assumed quantities are addressed in Section 3.0 Site Analysis, Paragraph 3.2.1 Site Demolition.

G1030 SITE EARTHWORK

G103001 GRADING

Perform site grading in accordance with UFC 3-201-01, Civil Engineering. Establish finish floor elevations for new facilities and elevations for mechanical/electrical equipment pads in accordance with UFC 3-201-01 Civil Engineering, UFC 1-200-1 DoD Building Code paragraph titled "Structural Design", IBC Section titled "Flood Loads", ASCE 24-14, or UFC 3-101-01 Architecture, whichever is more stringent.

G103002 COMMON EXCAVATION

Perform common excavation with equipment of sufficient size to accomplish the work required. Over excavation of areas to obtain additional satisfactory material for the Contractor's use is not permitted.

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 offsite.

G103003 ROCK EXCAVATION

Hard materials will not be encountered.

Blasting will not be permitted.

G103004 FILL & BORROW

Common fill in the quantities required is not available at the project site.

Backfill and fill material in the quantities required is not available at the project site.

Select fill in the quantities required is not available at the project site.

Top soil in the quantities required is not available at the project site.

G103004 1.1 REQUIREMENTS FOR OFF SITE SOIL

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

G103005 COMPACTION

Provide proper compaction equipment to meet compaction requirements based on a standard Proctor (ASTM D 698). The in-situ moisture content of the subsurface material is expected to be higher than the optimum moisture content from a modified Proctor. The Contractor should be prepared to adequately dry the in-situ soils prior to placement as common fill. The compaction requirements for this project are listed below:

Structures, Foundations, and Concrete Slabs: Compact top 12 inches of subgrade and subsequent structural fill to 95 percent of ASTM D 698.

Roads, parking areas, and retaining walls: Compact top 12 inches of subgrade and subsequent fill to 95 percent of ASTM D 698.

Green Areas: Compact to 85 percent of ASTM D 698.

G103006 SOIL STABILIZATION

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

G103007 SLOPE STABILIZATION

Not used.

G103008 SOIL TREATMENT

Chemically treat the entire foundation of each building for termites.

G103009 SHORING

Provide sheeting, shoring, bracing, cribbing, trench boxes, and underpinning as required to prevent undermining of foundations, pavement, utility pipes, structures, and slabs and prevent slippage or movement in embankments or slopes adjacent to excavations to facilitate construction. Shoring will be provided in accordance with Section 25 A and B of EM 358-1-1. Provide sheeting and shoring plan if required by local codes and/or OSHA. The plan must be signed and sealed a professional engineer registered in the Commonwealth of Virginia.

Permanent support of excavation elements must be designed based on at-rest earth and hydrostatic pressures, in addition to appropriate construction and service life surcharge pressures. Lateral displacement tolerances must be specified by the designer of record.

Temporary support of excavation elements may be designed for mobilization of active earth pressures and hydrostatic pressures, in addition appropriate construction surcharge pressures corresponding to a maximum allowable rotation of 0.02 or 3", whichever is less.

G103010 TEMPORARY DEWATERING

Dewatering will be required to construct subsurface project elements, and will likely be comprised of shallow sumps with pumping. Discharge of all pumped water shall be routed away from ongoing work and prepared subgrades. Discharge must comply with all necessary environmental permits.

Provide pumps, ditching, and grading during construction to prevent conditions that will promote the deterioration of the soil or interruptions to construction progress. The Geotechnical Report must include a recommendations regarding how deep the water level should be kept below footings during construction.

Erosion and sediment control normally associated with ground disturbance must be implemented and maintained throughout the construction process. All dewatering effluent must be filtered prior to discharge to minimize sediment to surface water.

G103011 TEMPORARY EROSION & SEDIMENT CONTROL

Where land disturbance equals or exceeds 10,000 sf, prepare an Erosion and Sediment Control Plan, and obtain final plan approval from the Virginia Department of Environmental Quality (VDEQ) as required by the Virginia Erosion and Sediment Control Law.

G103090 OTHER SITE EARTHWORK

Not used.

G1040 HAZARDOUS WASTE REMEDIATION

Not used.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

G20 SITE IMPROVEMENTS

SYSTEM DESCRIPTION

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

GENERAL SYSTEMS REQUIREMENTS

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

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

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

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

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

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

G2010 ROADWAYS & SERVICE DRIVES

Provide roadways of bituminous pavement. Aggregate pavement may not be used.

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

Provide pavement sections as indicated or specified in this RFP. The minimum PCC pavement must be 6" 650 psi flexural strength concrete surface course over 8" DOT Aggregate Base course. The minimum bituminous concrete pavement section must be 3" DOT HMA Surface Course Type SM-9.5D, 3" DOT HMA Intermediate Course Type IM-19.0D, and 8" DOT Aggregate subbase course. A minimum 12 thick sand subbase layer (min. CBR Value 20) underlain by a stabilization geotextile (AASHTO M288 CLASS 1 WOVEN GEOTEXTILE (ELONGATION < 50 PERCENT) SEAMS OVERLAPPED MINIMUM OF 24") must be provided beneath all pavements. The pavement subgrade must be prepared and tested in accordance with DOT requirements.

A subsurface drainage system must be provided in all roadway areas. The subsurface drainage system must consist of as a minimum weep holes in all drainage structures and perimeter underdrain or strip drains designed such that the aggregate base and sand subbase layers remain in a drained (i.e. unsaturated) condition during service. The specified pavement sections are the minimum acceptable to the Government. The Contractor must include the costs of the minimum specified sections in their base bid.

G201001 BASES & SUBBASES

Refer to the Virginia Department of Transportation (VDOT) Road and Bridge Specifications for materials allowed for base or subbase courses.

G201002 CURBS & GUTTERS

Provide curb and gutter to tie into adjacent facilities.

G201003 PAVED SURFACES

Recycled asphalt pavement material may be used for bituminous pavement as permitted by the SHS.

G201004 MARKING & SIGNAGE

Provide pavement markings including crosswalks.

Provide signage to match existing.

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

G201005 GUARDRAILS & BARRIERS

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

G201006 RESURFACING

Provide resurfacing of existing pavement by bituminous overlay.

G201090 OTHER ROADWAYS

Not used.

G2020 PARKING LOTS OR EQUIPMENT OPERATIONS AREA

Provide parking lots or equipment operations area of bituminous pavement. Aggregate pavement may not be used.

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

Pavement sections must incorporate a minimum 3-inch DOT HMA Type SM-9.5A Surface Course and 8-inch DOT Aggregate Base course layer underlain by a stabilization geotextile (AASHTO M288 Class 1 woven geotextile (elongation < 50 percent), seams overlapped min. of 24"). Prepare and test the pavement subgrade in accordance with DOT requirements.

Provide a subsurface drainage system in all parking lot areas. The subsurface drainage system must consist of, as a minimum, weep holes in all drainage structures designed such that the aggregate base layer remains in a drained (i.e. unsaturated) condition during service. The specified pavement section is the minimum acceptable to the Government. The Contractor must include the costs of the minimum specified section in their base bid.

G202001 BASES & SUBBASES

Refer to the Virginia Department of Transportation (VDOT) Road and Bridge Specifications for materials allowed for subbase courses.

G202002 CURBS & GUTTERS

Provide curb and gutter to tie into adjacent facilities.

G202003 PAVED SURFACES

Recycled asphalt pavement material may be used for bituminous pavement as permitted by the SHS.

G202004 MARKING & SIGNAGE

Provide permanent and temporary markings (pavement, curb and object), signage (regulatory, warning and guidance) and other traffic control devices as required to facilitate proper utilization of the parking areas.

Provide pavement markings including crosswalks.

Provide signage to match existing.

Provide temporary pavement markings and signage to meet phasing requirements indicated in the Project Program. Provide temporary signage in accordance with the MUTCD and the Virginia Work Area Protection Manual.

G202005 GUARDRAILS & BARRIERS

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

G2030 PEDESTRIAN PAVING

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.

G203001 BASES & SUBBASES

Not used.

G203002 CURBS & GUTTERS

Not used.

G203003 PAVED SURFACES

Provide Portland cement concrete (PCC) with a minimum compressive strength of 3500 psi at 28 days. Size of aggregate must not exceed 1-1/2 inches.

G2040 SITE DEVELOPMENT

G204001 FENCING & GATES

Provide high security chain link fence as indicated on the drawings in Part 6.

Provide zinc-coated steel fencing components in accordance with FS RR-F-191/1, Type 1 for the fencing system. Provide top and bottom tension wires; where tying into an existing fence, match fencing system.

For the security fence, provide one single line fence surrounding the restricted area. Provide security clear zones as required. Ensure that the fabric height is at least 7 feet (2.1 m). Provide outriggers and three strands of barbed wire. Design security fencing in accordance with UFC 4-022-03, *Security Fences and Gates*.

G204002 RETAINING AND FREESTANDING WALLS

Not used.

G204003 EXTERIOR FURNISHINGS

Not used.

G204004 SECURITY STRUCTURES

Not used.

G204005 SIGNAGE

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

G2050 LANDSCAPING

Provide complete landscaping consisting of lawn 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.

Guarantee landscaping for a period of one year. Provide a one year Establishment and Maintenance period. Landscaping Guarantee and Establishment and Maintenance periods must commence on the date that the inspection by the Contracting Officer shows that all landscaping under this contract has been satisfactorily installed.

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

G205001 FINE GRADING AND SOIL PREPARATION

Provide 4" 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.

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. .

G205004 SEEDING SPRIGGING AND SODDING

Seed grass areas disturbed due to construction activities or areas requiring turf cover such as grass median islands. 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.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

G30 SITE CIVIL/MECHANICAL UTILITIES

SYSTEM DESCRIPTION

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

Provide each system complete and ready for operation.

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

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

Complete and submit Utility Connection Permit Application and supporting documents for review and approval of utility connections to Government-owned systems.

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

The disturbed area is assumed to be between 0.50 and 0.75 acres.

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.

Verify the sanitary sewer connection to the sanitary sewer system by visual testing. Complete a visual inspection.

Leakage test is required.

Perform post-installation TV inspection of new storm sewer mains.

Imported bedding material must be provided for all utility lines and structures. Bedding material must consist of either ASTM C33 sand, No. 57 crushed stone or No. 8 crushed stone. A minimum of 6 inches of bedding must be provided for all utility lines and a minimum of 12 inches of bedding must be provided for all utility structures. Bedding material backfill must be placed to the spring line of the pipe for all concrete and PVC pipe trench excavations.

Utility line and utility structure excavations in existing pavement areas must be completed backfilled with flowable fill meeting DOT specifications to the aggregate base/subbase course subgrade elevation.

G3010 WATER SUPPLY

The new water system is an extension of the existing water system. The existing water system serving the project site is owned by the Federal Government. Provide the new water system and connections to the existing water system in accordance with 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 with the existing Fleet Readiness Center compound and Building SP300. Do not provide a separate meter for the new Composite Shop, unless otherwise directed.

G301001 WELL SYSTEMS

Not used.

G301002 POTABLE WATER DISTRIBUTION

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

Provide exterior corrosion protection on metallic pipe lines.

Backflow preventers are required on service entrance lines. Refer to ESR D20 and D40 for providing reduced pressure backflow preventers.

G301003 POTABLE WATER STORAGE

Not used.

G301004 FIRE PROTECTION WATER DISTRIBUTION

Connect the new fire protection water distribution system to the distribution system at the point indicated on the drawings in Part 6 as otherwise directed.

G301005 FIRE PROTECTION WATER STORAGE

Not used.

G301006 NON-POTABLE WATER DISTRIBUTION

Not used.

G301007 PUMPING STATIONS

Not used.

G301008 PACKAGED WATER TREATMENT PLANTS

Not used.

G301090 OTHER WATER SUPPLY

Not used.

G3020 SANITARY SEWER

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

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

Provide connection to the existing sanitary sewer collection system at the point indicated on the drawings in another part of this RFP. In identifying a suitable point of connection, evaluate the capacity of the existing collection system.

G302001 SANITARY SEWER PIPING

Provide exterior corrosion protection on metallic pipelines.

G302002 SANITARY SEWER MANHOLES & CLEANOUTS

Provide precast concrete manholes only.

G302003 LIFT STATIONS AND PUMPING STATIONS

A wastewater pump station may be required. Provide exterior corrosion protection on metallic force mains.

Provide a submersible pump station in accordance with the utility provider's requirements. Provide pump station wet well of fiberglass construction.

Provide automatic control to start and stop the pump system. Provide automatic level control by floats in accordance with the preferences of the system owner to fill and prevent overflow of the wet well. Provide an emergency pump connection.

Provide a telemetering system and recording equipment to a location manned 24 hours a day for the transmission and recording of pump operation. Transmit alarms to a location manned 24 hours a day.

Provide electrical connections for a portable emergency generator hook-up sized to start up and maintain the total rated running capacity of the station, including the pumps, controls, lighting, ventilation and other auxiliary equipment.

G302004 PACKAGED SANITARY SEWER TREATMENT PLANTS

Provide a packaged sanitary sewer treatment plant with a capacity of 300 gallons per day.

G3030 STORM SEWER

The new storm sewer system is an extension of the existing storm sewer system. The existing storm sewer system serving the project site is owned by the Federal Government. Provide the new storm sewer system and connections to the existing storm sewer system in accordance with UFC 3-201-01 *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

Due to corrosive soil conditions, storm sewer piping materials are required to be polyvinyl chloride (PVC), reinforced concrete, polyethylene (PE) or polypropylene (PP).

G303002 STORM SEWER STRUCTURES

Provide precast reinforced or cast-in-place structures.

G303003 LIFT STATIONS

Stormwater pump stations are not allowed.

G303004 CULVERTS

Not used.

G303005 HEADWALLS

Not used.

G303006 EROSION & SEDIMENT CONTROL MEASURES

Provide erosion and sediment control measures that complies with the Virginia Sediment Control Law and Regulations.

G303007 STORM WATER MANAGEMENT

Provide stormwater management that complies with the Virginia Stormwater Management Act, UFC 3-201-01 *Civil Engineering*, UFC 3-210-10 *Low Impact Development*, FC 1-300-09N *Navy and Marine Corps Design Procedures*; whichever is more stringent. Provide Low Impact Development (LID) features in accordance with UFC 3-210-10 *Low Impact Development*. The following LID features may be used: sand filters. Do not use LID features that could attract hazardous wildlife on and/or around the airfield. The use of bioretention, dry wells, filter/buffer strips, bioretention swales, wet swales, rain barrels, cisterns, infiltration trenches, rain gardens, permeable pavement/pavers, and tree box filters are not allowed for this project. An underdrain system shall be provided for all LID features where infiltration is being attempted. The underdrain system should be connected to the storm sewer system or day lighted to provide positive drainage.

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

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

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

The Contractor must obtain State Stormwater Management and Erosion and Sediment Control regulatory permits required for the proposed work from the Virginia Department of Environmental Quality (VDEQ). Coordinate reports, submittals, and permit applications through the Contracting Officer.

G303090 OTHER STORM SEWER

An oil/water interceptor is not required.

G3040 HEATING DISTRIBUTION

Not used.

G3050 COOLING DISTRIBUTION

Not used.

G3060 FUEL DISTRIBUTION

G306001 LIQUID FUEL DISTRIBUTION PIPING

Not used.

G306003 LIQUID FUEL STORAGE TANKS

Not used.

G306004 LIQUID FUEL DISPENSING EQUIPMENT

Not used.

G306006 GAS DISTRIBUTION PIPING NATURAL GAS

The new natural gas system is an extension of the existing natural gas distribution system for the FRC Compound. The existing natural gas distribution system serving the project FRC Compound is owned and maintained by Virginia Natural Gas. Coordinate with utility provider and provide natural gas piping system in accordance with utility provider's requirements. .

G306007 GAS STORAGE TANKS

Not used.

G306009 OTHER GAS DISTRIBUTION

Not used.

G306090 OTHER FUEL DISTRIBUTION

Not used.

G3090 OTHER SITE MECHANICAL UTILITIES

Not used.

-- End of Section --

6. ENGINEERING SYSTEMS REQUIREMENTS

G40 SITE ELECTRICAL UTILITIES

SYSTEM DESCRIPTION

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

GENERAL SYSTEM REQUIREMENTS

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

G4010 ELECTRICAL DISTRIBUTION

Connect to the existing 11.5 kV, 480Y/277 volt, three phase, four wire, 60 Hertz electrical power system. The connection point must be underground at Manhole SP44 and extended to the project site underground in concrete encased ductbank to a Pad Mounted Transformer.

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

G401001 SUBSTATIONS

Not used.

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. Loop feed switch
3. Feed-thru inserts
4. Six surge arresters for loop feed circuits.
5. Biodegradable less-flammable liquid-insulated

G401003 SWITCHES, CONTROLS AND DEVICES

Not used.

G401004 OVERHEAD ELECTRIC CONDUCTORS

Not used.

G401005 TOWERS, POLES, CROSSARMS AND INSULATORS

Not used for overhead power distribution.

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". Provide fused cut-outs on connections to overhead distribution systems.

G401007 DUCTBANKS, MANHOLES, HANDHOLES AND RACEWAYS

Provide a system of concrete encased ductbanks, handholes and manholes for all underground power wiring.

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.

G401010 CATHODIC PROTECTION SYSTEMS

Provide cathodic protection.

G401011 EQUIPMENT REQUIREMENTS FOR COASTAL AND HIGH HUMIDITY AREAS

Provide exterior equipment designed for coastal and high humidity areas.

G4020 SITE LIGHTING

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

G402001 EXTERIOR LIGHTING FIXTURES AND CONTROLS

Area and Parking Lighting for adjacent parking lot

Provide LED type lighting fixtures, complete with lamps. LED lighting fixture type shall match style used in surrounding facility parking lots.

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

Provide lighting control for exterior lighting fixtures with individual photocell switches on each luminaire.

G402002 SPECIAL SECURITY LIGHTING SYSTEMS

Not used.

G402003 OTHER AREA LIGHTING

Not used.

G402004 LIGHTING POLES

Provide concrete poles complete with foundations for site lighting.

G402005 UNDERGROUND ELECTRIC CONDUCTORS

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

G402006 DUCTBANKS, MANHOLES AND HANDHOLES

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

G402007 GROUNDING SYSTEMS

Provide a complete grounding system for all site lighting systems.

G4030 SITE COMMUNICATION AND SECURITY

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

G403001 TELECOMMUNICATIONS SYSTEMS

The connection point for the site telecommunications systems must be underground and extended to the project site underground in direct buried in conduit to the telecommunications equipment room.

Provide 12 strand single mode fiber optic cable between the connection point and building entrance facilities.

Provide 1 empty 4 inch spare conduit with pull strings for Government provided cable.

G403002 CABLE TV SYSTEMS (CATV)

Not used.

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 direct buried system for site telecommunications and security.

G403005 TOWERS, POLES AND STANDS

Not used.

G403006 TV CAMERAS AND MONITORS

Not used.

G403007 ELECTRONIC SECURITY SYSTEMS (ESS)

Not used.

G403008 OTHER COMMUNICATION AND ALARM

Not used.

G403009 GROUNDING SYSTEMS

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

G403010 INDUSTRIAL CONTROL SYSTEMS (ICS)

Not used.

G4090 OTHER SITE ELECTRICAL UTILITIES

Not used.

G409007 PHOTOVOLTAIC ENERGY SYSTEM

Not used.

-- End of Section --

6. ENGINEERING SYSTEMS REQUIREMENTS

H10 WATERFRONT STRUCTURES

Not Used.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

H20 GRAVING DRYDOCKS

Not Used.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

H30 COASTAL PROTECTION

Not Used.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

H40 NAVIGATION DREDGING AND RECLAMATION

Not Used.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

H50 WATERFRONT UTILITIES

Not Used.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

H60 WATERFRONT DEMOLITION

Not Used.

--End of Section--

6. ENGINEERING SYSTEMS REQUIREMENTS

H70 WATERFRONT ATFP

Not Used.

--End of Section--

PART FOUR

PERFORMANCE TECHNICAL SPECIFICATIONS

SECTION A10

FOUNDATIONS 12/18

A10 GENERAL

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

A10 1.1 DESIGN GUIDANCE

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

A10 1.1.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

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

UFGS Section 31 23 00.00 Excavation and Fill
20

A10 1.2 GENERAL REQUIREMENTS

A10 1.2.1 Earthwork

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

UFGS Section 31 23 00.00 20 *Excavation and Fill*

A10 1.2.2 Geotechnical Report

A10 1.2.2.1 Subsurface Soils Information

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

A10 1.2.2.2 Contractor-provided Geotechnical Engineer

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

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

A10 1.2.2.3 Contractor-Provided Geotechnical Report

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

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

- the foundation and floor slab, all underground construction including utility installation and all other site-specific requirements (such as soil stabilization and slope stability).
- c. Engineering analysis, discussion and recommendations addressing:
- 1) Settlement analysis. Settlement must be limited as required in EM 1110-1-1904, *Settlement Analysis*
 - 2) Bearing Capacity Analysis.
 - 3) Foundation selection and construction considerations (shallow, deep, special); dimensions, and installation procedures.
 - 4) Site preparation (earthwork procedures and equipment), compaction requirements, building slab preparation (as applicable), soil sensitivity to weather and equipment, groundwater influence on construction, mitigation of expansive soils or liquefaction potential, dewatering requirements, slope stability, and other necessary instructions.
 - 5) Sheet piling 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 00.05 20, *Design and Construction Quality Control*. Provide special tests and special inspections in accordance with Part 2 Section 01 45 00.05 20.

A10 1.3.1 Earthwork

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

A10 1.3.2 Piles

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

specifications prior to acceptance of the work.

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

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

Submit results of the pile test program and final pile installation criteria to the 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 23 00.00 20 *Excavation and Fill*

A10 1.5 CONSTRUCTION SUBMITTALS

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

All structural elements necessary for construction

Contractor-provided geotechnical report

Controlled fill or backfill material tests

Test pile and production pile installation records

File 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
12/18

A20 GENERAL

Not Used.

-- 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)
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UFC 4-023-03	Design of Buildings to Resist Progressive Collapse
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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 00.05 20, *Design and Construction 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

Not used.

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

Not used.

-- End of Section --

SECTION B20

EXTERIOR ENCLOSURE 12/18

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 [Construction Criteria Base \(CCB\)](#) at the [Whole Building Design Guide Website](#), are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the referenced standard at the time of contract award.

B20 1.1.1 Industry Standards and Codes

NATIONAL LUMBER GRADES AUTHORITY (NLGA)

B20 1.1.2 Government Standards

Military Handbook 1013/1A, *Design Guidance for Physical Security of Facilities*

UNIFIED FACILITIES CRITERIA (UFC)

UFC 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)
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UFC 1-200-02	High Performance and Sustainable Building Requirements
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B20 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory exterior enclosure system performance via Performance Verification Testing, and by field inspection as detailed in this section of the RFP. Provide special tests and special inspections in accordance with Part 2 Section 01 45 00.05 20, *Design and Construction Quality Control*. The cost of all testing is included in the Contract.

B20 1.2.1 Required Brick Masonry Testing and Field Samples

- a. Where field testing is required, determine masonry strength in accordance with American Concrete Institute (ACI) 530.1.
- b. Field Samples: Masonry Panel Requirements - At the job site submit for approval by the Designer of Record, a sample masonry panel minimum 8 feet (2.4 meters) long by a minimum of 4 feet (1.2 meters) high. Actual Sample size will be determined by number of components in the sample wall but provide a span of at least 4 feet (1.2 meters) of uninterrupted brickwork and 2 feet (.6 meters) above wall openings. The approved sample must exhibit the standard for workmanship and materials for the project. The sample panel must include brick coursing, bond, weep holes, flashing, thickness, anchors, joint reinforcing, wall ties, rigid-board insulation, intersection of walls, bond beams, expansion and control joints, and tooling of joints, range of color, texture of masonry, and mortar color; or cold-formed steel framing, insulation, fiberglass-faced gypsum sheathing, air barrier, moisture barrier/vapor retarders, exterior enclosure barrier connections to adjoining construction, sealing of exterior enclosure barrier penetrations, sealant, masonry ties and anchors, and tooling of joints, the range of color and texture of brick veneer, and the color of mortar. Protect the sample panel from damage at the site until masonry work is complete and approved, at which time the panel must be removed from the site. If there are windows or curtain walls in the project which interface with the masonry, a cut-away sample window or curtain wall mock-up must be installed in the masonry field panel, with all accessories, finishes, and trim (see B20 1.2.4 and 1.2.5). Masonry work must match the approved sample.

B20 1.2.2 Air Barrier Field Sample

Designate a portion of the project that reveals the various edge, seam, transition, and penetration conditions that the air barrier is exposed to. Determine this location with the Contracting Officer and obtain approval of the sealing methods employed on the project from the air barrier Manufacturer. Leave sample area exposed to view as long as practical to serve as a construction standard and comparison of future air barrier construction on the project. Before construction covers the sample area, provide detailed photographs of the air barrier details for future reference.

B20 1.2.3 Air Barrier Performance

Provide air barrier inspection on all projects and air barrier performance testing when required in RFP Part 3, Section B20.

B20 1.2.3.1 Air Barrier Inspection

Coordinate all subcontractors that provide part of the air barrier construction to provide an air tight barrier. Review the air barrier prior to being covered by subsequent construction to confirm that the air barrier complies with the following requirements;

- a. Prior to applying an air barrier, confirm that the substrate complies with conditions required by the applied air barrier material manufacturer.
- b. Air barrier must create a continuous barrier, without gaps, "fish mouths", holes, unsealed seams, or unsealed penetrations.
- c. Air barrier components are compatible and capable of being permanently connected to form an air tight barrier.
- d. Construction of the air barrier complies with air barrier design as indicated in the Basis of Design and exterior enclosure barrier drawings.
- e. Air barrier is installed in accordance with manufacturer's standard details available on the Air Barrier Association of America (ABAA) website named "Air Barrier Materials, Components, Assemblies & Systems" and found at the following web link;
http://www.airbarrier.org/materials/assemblies_e.php

B20 1.2.3.2 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 07 05 23, *Pressure Testing an Air Barrier System for Air Tightness*, and Contractor must perform testing as described in that specification. Where conflicts exist between the UFGS Section 07 05 23 and this performance specification, UFGS Section 07 05 23 will govern. The air leak flow rate must not exceed 0.25 CFM at 75 Pa per square foot (0.076 cm 75 Pa per square meter) of building enclosure area including roof or ceiling, walls and floor as provided by the DOR.

Method 1: This test consists of measuring the flow rates required to establish 12 positive and 12 negative

building pressures from at least 25 Pa to at least 50 Pa. Take at least 12 bias pressure readings across the building enclosure averaged over 5 seconds each before and after the test. None of these readings must exceed 30% of the minimum test pressure.

Method 2: this test consists of measuring the flow rates required to establish 12 positive building pressures from at least 50 Pa to at least 75 Pa. Take at least 12 bias pressure readings across the building enclosure averaged over 5 seconds each before and after the test. None of these readings must exceed 20% of the minimum test pressure.

- The test results must be either pass or fail. Provide the theoretical size of the opening that leaks the same amount as the building enclosure at 75 Pa, to facilitate the search for leaks and repair of the exterior enclosure.
- c. Provide infrared thermography to determine air leakage paths if facility fails to retain the required air pressure in the test above. Utilize infrared cameras with a resolution of 0.1 degree C or better.

Perform infrared thermography in accordance with ISO 6781:1983 and American Society for Testing and Materials (ASTM) C1060 and B20 1.2.4 *Thermal Envelope Performance Testing (Infrared Thermography)*. Determine air leakage pathways in accordance with ASTM E1186-03 *Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems*, and perform corrective work as necessary to achieve the whole building air leakage rate specified.

Modify construction to stop identified air leakage until target is reached. Correct air path leaks at the source of the leak, do not use sealant to close air leakage paths that are required to be opened for maintenance of the facility such as fixtures, switches covers, receptacle covers, access doors, etc.

- d. Seal air leaks in the following order of priority:
1. Top of the building. These include attics, roof/wall intersections, penthouse doors and walls, HVAC equipment.
 2. Bottom of the building. These include ground floor access doors and inspection hatches, exhaust and air intake vents, service penetrations of enclosure, crawl spaces.
 3. Vertical shafts. These include gasket stairwell fire doors, fire hose cabinets and recessed toilet accessories connected to vertical shaft, vertical and horizontal utility penetrations in service rooms, elevator rooms and shafts.
 4. Exterior walls. These include weather strip doors and windows, exhaust fans and ducts, service penetrations, electrical receptacles, wall base.

B20 1.2.4 Thermal Envelope Performance Testing (Infrared Thermography)

Where required in RFP Part 3 or B20 1.2.3.2 *Air Barrier Performance Testing*, provide infrared thermal testing and repair as follows (coordinate with air barrier testing):

- a. Test the building envelope using Infrared Thermography technology. Complete thermography testing in accordance with the requirements of ASTM C1060 and ISO 6781. The Contracting Officer will witness the testing. Testing must occur just before the building air tightness test. Testing must also occur during the air tightness test so that areas of building air leaks are detected. If the building air tightness test is failed, repeat thermographic testing just before and during subsequent air tightness tests until the air tightness test is successful.
- b. Thermography Test Procedures: Submit detailed test procedures indicating the test apparatus, the test methods and procedures, and the analysis methods to be employed not later than 60 days after Notice to Proceed.
- c. Thermography Test Report: Provide a report. The report must include thermographs in color and a color temperature scale to define the temperature indicated by the various colors. The report must identify the high temperature reading, the outdoor air temperature, the building indoor air temperature, and the wind speed and direction. The report must note any areas of compromise in the building envelope, and must note all actions required and taken to correct those areas.
- d. Final Test: Final thermography test report must demonstrate the problem areas have been corrected. Submit the complete test and analysis for review and approval.

B20 1.2.5 Required Records for Concrete Wall Panels

Not used.

B20 1.2.6 Precast Concrete Wall Panel Surface Finish Sample

Not used.

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) 7-02 calculated requirements (PSF or Kg/m²) for water resistance, which must not exceed .667 % of the products capable water based on AAMA 101/I.S.2. Allowable rates of air leakage for field testing must be 1.5 times applicable AAMA 101/I.S.2 rate for the Product Type and Performance Class.
- b. 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

Not used.

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 Corps Design Procedures*, UFC 3-101-01, *Architecture*, and UFC 3-301-01, *Structural Engineering*.

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

B20 1.4 CONSTRUCTION SUBMITTALS

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

Shop drawings for reinforcing steel in masonry walls, doors, door hardware, windows, 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

Not used.

B20 1.4.3 Sustainable Construction Submittals

Submit sustainable construction submittals in accordance with Part 2 Section 01 33 29.05 20, *Sustainability Reporting for Design-Build*.

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, 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 Hydrothermal Analysis - Perform a job specific vapor pressure and hydrothermal analysis in accordance with UFC 3-101-01, *Architecture*. The conclusion of the analysis must indicate if a moisture barrier/ vapor retarder is required, the appropriate locations of needed moisture barrier/ vapor retarder, and anticipated dew-point locations in the exterior enclosure during different critical times of the year.
- b. Wind Loads - Provide wind load calculations for exterior cladding in accordance with UFC 1-200-01 and UFC 3-301-01 with comparative analysis of the cladding system to be provided.
- c. Water Penetration - No water penetration must occur at a pressure of 8 psf (39 Kg/m²) of fixed area when tested in accordance with ASTM E 331.
- d. Insulating Value - Comply with UFC 3-101-01, *Architecture*, for the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) standards to determine the minimum insulating value of the complete wall system.

B201001 EXTERIOR CLOSURE

B201001 1.1 MASONRY VENEER EXTERIOR WALL CLOSURE COMPONENTS

B201001 1.1.1 General Requirements

- a. The masonry veneer includes the non-load bearing exterior walls of the structure, and also includes colored mortar, special shapes such as sills, headers, trim units and copings of brick

masonry, precast concrete, concrete masonry units, or other approved materials. Tie the veneer to the backup wall system with a system that allows the veneer to move independently of the backup wall system, while being structurally supported. Allow for expansion and contraction of the veneer without cracking the exterior material.

- b. Use running bond, tooled concave joints and full head joint weeps at 24 inches (610 mm) on center in the course immediately above the base flashing. Where rowlocks are permitted, slope rowlocks and project not less than 1/2 inch (13 mm) beyond the face of the wall to form a wash and drip. Where required, provide colored mortar conforming to ASTM C270. Provide special shapes where required.
- c. Locate expansion/control joints and seal with proper backing material and ASTM C 920 polyurethane sealant, or preformed foam or rubberized expansion joint closure. Conform to UFC 3-101-01 and BIA Technotes 18, 18A. Match joint color of the brick, unless DOR directs otherwise.
- d. Conform to ACI 530.1 for masonry veneer installation, including cold weather construction. Antifreeze admixtures are not to be used.
- e. Clean the masonry in accordance with manufacturer's instructions and BIA Technote 20.
- f. Utilize BIA Technical Notes to design, detail, and construct brick masonry walls. This PTS section amends the BIA documents and takes precedence over similar BIA requirements. Substitute directive language in the place of BIA suggestive language as required in PTS Section Z10, *General Performance Technical Specifications*. The results of these wording substitutions change this document to required procedures.

B201001 1.1.2 Face Brick

- a. Brick Masonry Appearance - Do not change source or supply of materials after brick manufacturing work has started. Blend all brick to produce a uniform appearance when installed. An observable "banding" or "layering" of colors or textures caused by improperly mixed brick is unacceptable.
- b. Brick Type - Provide brick in accordance with ASTM C216, Grade SW, type FBX. Test rating of ASTM C67 must be "Not effloresced".

B201001 1.1.3 Split Faced or Ground Faced Masonry

ASTM C 90. If required, provide split faced or ground faced units, or split-ribbed units or scored-faced units.

B201001 1.1.4 Cast Stone Trim Units

- a. Cast stone must be the product of a manufacturer regularly engaged in the manufacture of architectural cast stone (precast concrete building unit) products. Meet or exceed the requirements of ASTM C 1364.
- b. Trim units of cast stone include sills, fascias, header units, copings and other trim units as required by the approved design.

B201001 1.1.5 The Wall Cavity

Comply with UFC 3-101-01, *Architecture* and BIA Technical Notes 21A, 21B, 21C, 28B.

B201001 1.1.6 Through-Wall Flashing Components

Provide through-wall flashing over all openings, spandrels, shelf angles, lintels, and built-in structural steel members. Provide through-wall flashing below all openings, parapets copings, sills, and at the base of the wall. Provide a method of weeping water collected by the through-wall flashing to the outside of the wall.

- a. Incorporate weep holes to align with through-wall flashing in cavity wall construction as required by UFC 3-101-01, *Architecture*, and BIA Technotes. Install flashing according to BIA Technotes 7, 7A, 7B, 21A, 21B, 21C, 28B, and SMACNA figures 4-1A and 4-1B. Extend metal drip edge flashing beyond the wall plane using a 1/4 inch (6 mm) preformed 45 degree angle turn down.
- b. Provide flashing material as required by UFC 3-101-01, *Architecture* and the following: Provide flashing of 7 ounce copper flashing with a 3 ounce bituminous coating on each side or a fiberglass fabric bonded on each side of the copper sheet. Sixteen (16) ounce uncoated copper, 28 gauge Type 302 or 304 stainless steel is also acceptable. 'Flexible membrane flashing, plastic or PVC-based membrane flashing is prohibited. Lap and seal turndown solid metal drip edge flashing to through-wall flashing. Refer to "Flashing" in this section to find requirements for non-through-wall flashing.
- c. Incorporate the through-wall flashing in the water resistive barrier and seal joints to flashing to form a shingled effect and direct water to the exterior to the exterior enclosure and away from back-up wall assembly.
- d. Where flashing is not continuous, such as at masonry wall opening heads and sills, extend flashing four inches beyond each side of the opening and turn up ends to form a pan and prevent water from reentering the wall cavity.

B201001 1.1.7 Reinforcing in Veneer Layer

Reinforcing in the veneer layer must be galvanized in accordance with ASTM A 123/A123M, ASTM A153/A153M, or ASTM A653/A653M, Z275 (G90) coating, and be of sufficient size to eliminate damage to the veneer layer from wind and other live and dead loads imposed on the veneer layer.

B201001 1.2 METAL WALL PANEL EXTERIOR CLOSURE

B201001 1.2.1 General Wall Panel Requirements

Not used.

B201001 1.2.2 Steel Wall Panels

Not used.

B201001 1.2.3 Aluminum Wall Panels

Not used.

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

Not used.

B201001 1.4 EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

Not used.

B201001 1.5 CONCRETE EXTERIOR WALL CLOSURE

Not used.

B201001 1.6 CONCRETE WALL PANEL RESTORATION

Not used.

B201001 1.7 WOOD SIDING SYSTEM

Not used.

B201001 1.8 VINYL SIDING SYSTEM

Not used.

B201001 1.9 MANUFACTURED FACED PANELS SYSTEMS EXTERIOR WALL SIDING

Not used.

B201001 1.10 OTHER EXTERIOR WALL CLOSURE

Not used.

B201001 1.10.2 Concrete Unit Masonry

Not used.

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

Not used.

B201002 1.4 CAST-IN-PLACE CONCRETE SYSTEM

Not used.

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 hydrothermal 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 manufacture to seal joints and intersections for air-tightness of materials designated as part of the air barrier. Individual materials used in the continuous air barrier must have an air permeance not to exceed 0.004 cfm/ft² at a pressure differential of 0.3 inches water (1.56lb/ft²), (0.02 L/s. m² at 75 Pa) when tested in accordance with ASTM E 2178. If the air barrier is to be field tested, refer to the requirements in the paragraph entitled "Air Barrier Performance Testing" of this section for entire building minimum air permeance. Provide air barrier installation at windows in accordance with ASTM E 2112.

B201003 1.2.1 Exterior Enclosure Air Barrier Materials

Refer to Air Barrier Association of America (ABAA) to identify qualified materials with the appropriate performance for the air barrier. Utilize materials from the "ABAA Evaluated Air Barrier Materials" found at the following web link;
http://www.airbarrier.org/materials/index_e.php

B201003 1.3 WATER RESISTIVE BARRIER

Provide a water resistant barrier to resist bulk water penetration and wind-driven rain that passes the exterior cladding of the facility. Provide vapor permeable water resistant barrier if the water resistive barrier function is combined with other exterior enclosure barrier functions. Integrate water resistive barriers with wall flashing to form a shingled effect and direct water down the outside surface of the water resistive barrier, away from the back-up wall assembly, and out of the wall. Comply with the requirements of ASTM E2256 for mechanical fastened building wrap materials or ICC-ES Acceptance Criteria AC38 for other materials.

B201003 1.3.1 Exterior Enclosure Water Resistive Barrier Materials

Refer to Air Barrier Association of America (ABAA) to identify qualified materials with the appropriate performance for the water resistive barrier. Utilize materials from the "ABAA Evaluated Air Barrier Materials" found at the following web link;
http://www.airbarrier.org/resistive/index_e.php

B201003 1.4 MOISTURE BARRIER/ VAPOR RETARDER

Provide a moisture barrier/ vapor retarder to slow or reduce the unintended movement of water vapor in and out of conditioned space, if required by exterior enclosure vapor pressure and hydrothermal analysis. Perform the analysis and provide a moisture barrier/ vapor retarders in accordance with UFC 3-101-01, *Architecture*. Choose the moisture barrier/ vapor retarder permeability as a function of climate, the characteristics of the materials that comprise the assembly, and the interior conditions. If required, install moisture barrier/ vapor retarder materials on the warm side of the building assembly insulation (in the predominante season for the facility climate). Select moisture barrier/ vapor retarders in accordance with ASTM C755.

B201004 PARAPETS

Avoid parapets when possible, but when necessary, provide parapets with the same materials as the exterior wall construction, including framing members, anchors, flashings, cants, and accessories. Design parapets to withstand the lateral loads prevailing at the project site and be provided with thru wall 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

Not used.

B201006 BALCONY WALLS & HANDRAILS

B201006 1.1 PRECAST CONCRETE BALCONY WALLS

Not used.

B201006 1.2 UNIT MASONRY BALCONY WALLS

Not used.

B201006 1.3 METAL FRAMED ASSEMBLY BALCONY WALLS

Not used.

B201006 1.4 WOOD FRAMED ASSEMBLY BALCONY

Not used.

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

Not used.

B201006 1.5.4 Fiber Reinforced Plastic (FRP) Handrails

Not used.

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. Notwithstanding 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 23.00 20, *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 23.00 20, *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)

Not used.

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 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 1.2 mils.

B202001 1.1.3 Security Windows

Not used.

B202001 1.1.4 Plastic Windows, Factory Finish

Not used.

B202001 1.1.5 Wood Windows

Not used.

B202002 STOREFRONTS

Not used.

B202003 CURTAIN WALLS

Not used.

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

Not used.

B202004 1.1.8 Patterned Glass

Not used.

B202004 1.1.9 Spandrel Glass

Not used.

B202004 1.1.10 Spandrel Glass with Adhered Backing

Not used.

B202004 1.2 PLASTIC GLAZING

Not used.

B202004 1.2.1 Bullet-Resistant Plastic Sheet

Not used.

B202004 1.2.2 Acrylic Sheet Glazing

Not used.

B202004 1.2.3 Polycarbonate Sheet Glazing

Not used.

B202004 1.3 FRAGMENT RETENTION FILM FOR GLAZING

Not used.

B202090 OTHER EXTERIOR WINDOWS

B202090 1.1 OPERABLE TRAY PASS WINDOWS

Not used.

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

Not used.

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

Not used.

B203001 1.2.1 Stile and Rail Doors

Not used.

B203001 1.2.2 Flush Doors

Not used.

B203001 1.2.3 Wood Door Louvers

Not used.

B203001 1.2.4 Door Light Openings

Not used.

B203001 1.2.5 Fabrication

Not used.

B203001 1.3 FIBERGLASS REINFORCED PLASTIC (FRP) DOORS

Not used.

B203001 1.3.1 FRP Doors

Not used.

B203001 1.3.2 Accessories

Not used.

B203001 1.3.3 Standard FRP Frames

Not used.

B203001 1.3.4 Anchors

Not used.

B203001 1.3.5 Finishes

Not used.

B203002 GLAZED DOORS

B203002 1.1 ALUMINUM GLAZED DOORS

Not used.

B203004 OVERHEAD ROLL-UP AND OVERHEAD SECTIONAL DOORS

Not used.

B203004 1.1 OVERHEAD ROLL-UP DOORS

Not used.

B203004 1.2 OVERHEAD SECTIONAL DOORS

Not used.

B203004 1.3 OVERHEAD DOOR FINISH

Not used.

B203005 HANGAR DOORS

Not used.

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

Not used.

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 Sliding Composite Shop Door

For large format doors at Repair Shop areas, provide automatic double flush sliding panel doors. Provide door hardware in accordance to manufacturer's recommendations.

B203090 1.1.2 Automatic Sliding Composite Shop Door Controller

Automatic sliding entrance doors must be 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 12/18

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 [Construction Criteria Base \(CCB\)](#) at the [Whole Building Design Guide Website](#) are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award.

B30 1.1.1 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 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) 7 wind loading calculations or applicable building code requirements and UFC 3-301-01 *Architecture* and UFC 3-110-03 *Roofing*. The specified Factory Mutual (FM) rating incorporates a safety factor of 2 over the maximum calculated uplift pressure. Therefore, a FM rating of 1-90

correlates to a maximum uplift calculation of 2.2 kPa, 45 psf. When a rated system is specified, ensure the specified roof system is capable of meeting the wind uplift resistance specified. Where non-rated systems may be allowed and used, delineate calculated values in the roof specification or drawings. Utilize independently tested and rated roof systems, such as Factory Mutual (FM), Underwriters Laboratory (UL), and Single Ply Roofing Industry (SPRI).

The complete roof system assembly must be rated and installed to resist wind loads calculated in accordance with ASCE 7 and validated by uplift resistance testing in accordance with Factory Mutual (FM) test procedures. Non-rated systems must not be installed, except as approved by the Contracting Officer. Submit licensed engineer's wind uplift calculations and substantiating data to validate any non-rated roof system.

B30 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Provide verification of satisfactory roofing system performance via Performance Verification Testing, and by field inspection as detailed in this section of the RFP. All performance and acceptance testing including final/warranty inspections must be witnessed by the Contracting Officer on all significant roof projects.

A significant roof is defined as a single or group of buildings with greater than 15,000 square feet (1,400 m²) of roof area; or a roof with area that is allocated to energy generating equipment such as solar hot water panels or photovoltaic panels; or where building equipment (excluding HVAC), use, or safety causes multiple roof penetrations.

B30 1.2.1 Pre-Roofing Design Conference

If the project roof meets the definition of a significant roof above, provide a Pre-Roofing Design Conference. Schedule this conference prior to the roof design and roof layout of the facility. Required attendees include the Designer of Record (DOR), Design Quality Control (DQC) Manager, Roof Design Assurance Consultant (if applicable), Commissioning Authority, and Subcontractors directly responsible for installing the roof and equipment that will be mounted on the roof. Discuss and coordinate the following as a minimum:

- a. Renewable energy systems to be mounted on the roof and interface with building systems and utilities,
- b. Allocation of space on the roof for different functions,
- c. Impact of renewable energy systems and building orientation to the sun's 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 00.05 20, *Design and Construction Quality Control*, is required.

B30 1.3 DESIGN SUBMITTALS

Provide design submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities Criteria (FC) 1-300-09N, *Navy and Marine 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-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

Not used.

B301001 1.2 ASPHALT SHINGLES

Not used.

B301001 1.3 ROOF TILES

Not used.

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 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 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 500 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 underline 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-7, and FM I-49 for perimeter and flashing attachment.
- c. Fire Safety - The complete roof covering assembly shall meet ASTM E 108, Class 1A or UL 790, Class A; and be listed as Fire-Classified roof deck construction in the UL 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; and 2) 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)

Not used.

B301002 1.3 ETHYLENE PROPYLENE DIENE TERPOLYMER (EPDM)

Not used.

B301002 1.4 MODIFIED BITUMINOUS MEMBRANE ROOFING

This paragraph covers the requirements for modified bituminous membrane sheet roofing, SBS modified for 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 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. Expanded Perlite Board - ASTM C 728, minimum thickness of 3/4" boards, and 4' by 4' board size.
- b. Polyisocyanurate Board - ASTM C 1289, with a minimum compressive strength of 138 kPa (20 psi), unless overlaid with another board with a comparable or greater compressive strength. Use insulation facer as recommended by the roofing material manufacturer. Board size is restricted to 4' by 4' when applied in direct contact with concrete deck.
- c. Composite Boards - ASTM C 984 (Polyisocyanurate-perlite) or ASTM C 1050 (Polystyrene-wood fiberboard), Type III, Grade 1, Class A, or ASTM C 1289, Type V, oriented strand board or waferboard on one side and fibrous felt or glass fiber mat membrane or aluminum foil on the other.
- d. Wood Fiber (high density) - ASTM C 208

B301003 1.2.2 Tapered Roof Insulation

On portions of the roof where the sloping of structure does not allow the minimum slopes, provide a factory tapered roof insulation system to provide positive drainage of roof system, and to include drainage around curbs, penetrations, and projections through the roof plane. For new construction, provide one layer of the tapered roof insulation assembly factory tapered to a slope not less than 1/2" per foot (13 mm per 300 mm). For re-roofing applications where slopes of 1/2" per foot (13 mm per 300 mm) cannot be achieved, provide a minimum of 1/4" per foot (6.35 mm per 300 mm) slope.

B301003 1.2.3 Protection Board

Provide for use as a thermal barrier (underlayment) or protection board for hot-mopped applications.

B301003 1.2.4 Glass Mat Gypsum Roof Board

ASTM C 1177, with a 0 Flame Spread and 0 Smoke Developed when tested in accordance with ASTM E 84.

B301003 1.2.5 Bitumens

- a. Asphalt Primer - ASTM D 41
- b. Asphalt - ASTM D 312, Type III or IV
- c. Asphalt Roof Cement - ASTM D 4586, Type I for horizontal surfaces, Type II for vertical and sloped surfaces. Roof cement 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 placed 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

Not used.

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)

Not used.

B301090 1.3 VEGETATED ROOFS

Not used.

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 DEFICIENCIES, 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.

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**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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-- End of Section --

SECTION C10

INTERIOR CONSTRUCTION 12/18

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 [Construction Criteria Base \(CCB\)](#) at the [Whole Building Design Guide Website](#), are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award.

C10 1.1.1 Industry Standards and Codes

Sealant, Waterproofing & Restoration Institute

C10 1.1.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	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)
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UFC 1-200-02	High Performance and Sustainable Building Requirements
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C10 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

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

Quality Control at no additional cost to the Government.

C10 1.2.1 Slump and Compressive Strength Tests for Grout

Slump between 8 and 11 inches (200 and 275 mm). Provide minimum grout strength of 2000 PSI in 28 days, as tested in accordance with American Society for Testing and Materials (ASTM) C 1019.

C10 1.2.2 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 applicable laws and executive orders. At a minimum, the Composite Shop must be designed with *Guiding Principles for Sustainable Federal Buildings* and comply with the Energy Policy Act of 2005 and the Energy Independence and Security Act of 2007.

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

Not used.

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

Not used.

C101001 1.2.2.3 Pre-Faced Concrete Masonry Units

Not used.

C101001 1.2.2.4 Glass Masonry Units

Not used.

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

Not used.

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

Not used.

C101002 DEMOUNTABLE PARTITIONS

Not used.

C101003 RETRACTABLE PARTITIONS

Not used.

C101004 INTERIOR GUARDRAILS & SCREENS

Not used.

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

Not used.

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

Not used.

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

Not used.

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

Not used.

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

Not used.

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 than 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

Not used.

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 and 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 commercial sliding doors at Composite Shop areas as indicated. Sliding doors are to be configured to allow passage of loaded or unloaded monorail crane system. Insure positive sealing of doors to resist the passage of dust, debris, or paint materials. This is particularly critical at Layup-Bonding Room, to insure that epoxy bonding operations are not contaminated by dust particles from the adjacent Machining/Grinding Room operations.

C102005 INTERIOR OVERHEAD DOORS

Not used.

C102006 INTERIOR GATES

Not used.

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

Not used.

C102007 1.1.5 Card Key System

Not used.

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

Not used.

C102091 OTHER INTERIOR PERSONNEL DOORS

Not used.

C1030 SPECIALTIES

C103001 COMPARTMENTS, CUBICLES AND TOILET PARTITIONS

Not used.

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

Not used.

C103002 1.1.6 Towel Bars

Not used.

C103002 1.1.7 Grab Bars

Provide stainless steel grab bars in accordance with 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 Grade 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

Not used.

C103009 CABINETS

Not used.

C103010 CASEWORK

Not used.

C103011 CLOSETS

Not used.

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-resistive 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 minimum 3/8 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

Not used.

C103090 OTHER INTERIOR SPECIALTIES

Not used.

-- End of Section --

SECTION C20

STAIRS 12/18

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 [Construction Criteria Base \(CCB\)](#) at the [Whole Building Design Guide Website](#), are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award.

C20 1.1.1 Industry Standards and Codes

AISC American Institute of Steel Construction

C20 1.1.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 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) :
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UFC 3-101-01	UFC 1-200-02	Architecture High Performance and Sustainable Building Requirements
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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

Not used.

C201002 FIRE ESCAPE STAIRS

Not used.

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

Not used.

C201090 1.1.4 Glass Handrails

Not used.

C201090 1.1.5 Wood Handrails

Not used.

C201090 1.1.6 Fiber Reinforced Plastic (FRP) Handrails

Not used.

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

Not used.

-- End of Section --

SECTION C30

INTERIOR FINISHES 01/20

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 [Construction Criteria Base \(CCB\)](#) at the [Whole Building Design Guide Website](#), are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the referenced standard at the time of contract award.

C30 1.1.1 Industry Standards And Codes

FLOOR COVERING INSTALLATION CONTRACTOR'S ASSOCIATION (FCICA)

FLOOR COVERING INSTALLATION BOARD (FCIB)

TILE COUNCIL OF NORTH AMERICA (TCNA)

C30 1.1.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements) (A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-101-01, ArchitectureUFC 3-120-10, Interior Design)
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UFC 1-200-02	High Performance and Sustainable Building Requirements
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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

Not used.

C301003 GYPSUM WALLBOARD FINISHES

Not used.

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 1.1.3

Porcelain wall tile must be through color, polished or unpolished. Refer to project program for tile type, pattern, and surface texture.

C301005 WALL COVERINGS

Not used.

C301006 ACOUSTICAL PANELS ADHERED TO WALLS

Not used.

C301090 OTHER WALL FINISHES

C301090 1.1 SOLID SURFACING WALL FINISHES

Not used.

C301090 1.2 PLASTIC LAMINATE WALL FINISHES

Not used.

C301090 1.3 DECORATIVE PANELING SYSTEM

Not used.

C301090 1.4 WOOD TRIM AND DETAILING FINISHES

Not used.

C301090 1.5 IMPACT RESISTANT PANEL OR WAINSCOT WALL FINISHES

The stainless steel wall covering system must be Type 304, No. 4 satin finish, 18 gauge, certified USA milled and include all accessories such as top caps, joint covers, and inside and outside corners, necessary for a complete installation. The stainless steel wall panel must have coordinating color and pattern options for all components within the system.

C301090 1.6 CORNER AND WALL GUARDS

Not used.

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

Not used.

C302002 TERRAZZO FLOOR FINISHES

Not used.

C302003 WOOD FLOORING

Not used.

C302004 RESILIENT FLOOR FINISHES

Not used.

C302005 CARPETING

Not used.

C302006 MASONRY AND STONE FLOORING

Not used.

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

Integral resinous epoxy cove wall bases must be installed in accordance with the manufacturers' printed instructions to include a cove stick having a minimum radius of 1 inch (25.4 mm) and finished with an approved cap strip.

C302007 1.2 CARPET WALL BASE FINISHES

Not used.

C302007 1.3 WOOD BASE FINISHES

Not used.

C302007 1.4 STONE AND MARBLE BASE FINISHES

Not used.

C302007 1.5 TILE BASE FINISHES

Not used.

C302008 STAIR FINISHES

Not used.

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.

C302011 RAISED ACCESS FLOORING

Not used.

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	.60	35-39

spaces, Lobbies, Corridors		
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

Not used.

C303003 PLASTER CEILING FINISHES

Not used.

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

Not used.

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

Not used.

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
12/18

D10 GENERAL

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

Comply with the requirements of UFC 1-200-01, *DoD Building Code*.

D10 1.1 DESIGN GUIDANCE

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

Industry standards, codes, and Government standards referenced in the section text that are **not** found in the Unified Master Reference List (UMRL) in the [Construction Criteria Base \(CCB\)](#) at the [Whole Building Design Guide Website](#), are listed below for basic designation identification. Refer to the UMRL for full reference standard title and current document date. Comply with the required and advisory portions of the current edition of the referenced standard at the time of contract award.

D10 1.1.1 Industry Standards and Codes

Although some the following references are listed in the UMRL, they are repeated here for emphasis.

References publications in this RFP that refer to the "authority having jurisdiction" 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)
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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

Not used.

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 underrunning 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. 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 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:

$$DL \text{ (DLFB)} + TL \text{ (DLFT)} + LL \text{ (1 + HLF)} + IFD + SK$$

Test Loads (Stress Level 3). In this calculation use $LL = 1.25 \times$ 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, *Electronic Facility Operation and Maintenance Support Information* (eOMSI) 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

Not used.

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 Cranes* and 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 °F to 105 °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 CFR 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 directly 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 Wire Rope

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 wire rope breaking force to the calculated load on the wire rope when the hoist is assumed loaded to rated capacity. Certification from hoist manufacturer of provided 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 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 $.375 \times \text{rope diameter}$ and drum groove pitch must be $1.14 \times \text{rope diameter}$ 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

Not used.

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)

Not used.

D102004 1.4 PNEUMATIC POWERED WIRE ROPE HOIST(S)

Not used.

D102004 1.5 PNEUMATIC POWERED CHAIN HOIST(S)

Not used.

D102004 1.6 MANUAL HOIST WITH TROLLEY

Not used.

D1030 ESCALATORS AND MOVING WALKS

Not used.

D103001 ESCALATORS

Not used.

D103002 MOVING WALKS

Not used.

D109002 CONVEYORS

Not used.

-- End of Section --

SECTION D20

PLUMBING 12/18

D20 GENERAL

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

D20 1.1 NARRATIVE

Use this section in conjunction with all parts of the Design Build (D/B) Request for Proposal (RFP) to determine the full requirements of this solicitation.

This section includes the construction of interior plumbing systems. This section covers installations inside the facility and out to the five foot line. See Section G30, *Site Civil/Mechanical Utilities*, for continuation of systems beyond the five foot line.

D20 1.2 PLUMBING DESIGN GUIDANCE

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

D20 1.2.1 Government Standards

Federal Energy Management Program (FEMP)

UNIFIED FACILITIES CRITERIA (UFC)

UFC 1-200-01	DoD Building Code (General Building Requirements) (A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s):UFC 3-401-01, Mechanical EngineeringUFC 3-420-01, Plumbing Systems)
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UFC 1-200-02	High Performance and Sustainable Building Requirements
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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

Not used

D201001 1.3 FLUSH TANK WATER CLOSETS

Not used

D201001 1.4 DUAL FUNCTION FLUSH TANK WATER CLOSETS

Not used

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

Not used

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

Not Used

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

Not used

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

Not used

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

Not Used

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

Not Used

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
12/18

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)
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UFC 1-200-02	High Performance and Sustainable Building Requirements
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UFC 3-440-01	Facility-Scale Renewable Energy Systems
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UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS 01 78 24.00 20	Electronic Facility Operation and Maintenance Support Information
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 Systems for HVAC and Other Building Control Systems
UFGS 23 09 13	Instrumentation and Control Devices for HVAC
UFGS 23 81 23.00 20	Computer Room Air Conditioning Units

D30 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

- a. Verification of satisfactory HVAC system performance 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

Not used

D30 1.5 DESIGN SUBMITTALS

Submit design Submittals in accordance with Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, and UFC 3-401-01, *Mechanical Engineering*.

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

with the limitations stated in PTS section Z10, *General Performance Technical Specifications*.

UFGS 01 78 24.00 20, *Facility Electronic Operation and Maintenance Support Information*

UFGS 23 09 00, *Instrumentation and Control for HVAC*

UFGS 23 09 23.02, *BACnet Direct Digital Control Systems 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

Not used

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

Not used

D301002 1.5 PROPANE TANKS

Not used

D301003 STEAM SUPPLY SYSTEM (FROM CENTRAL PLANT)

Not used

D301004 HOT WATER SUPPLY SYSTEM (FROM CENTRAL PLANT)

Not used

D301005 SOLAR ENERGY SUPPLY SYSTEM

Not used

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

Not used

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

Not used

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

Not used

D302004 1.2 CONDENSATE RETURN UNITS

Not used

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 IGSHA 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

Not used.

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

Not Used

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 $\mu\text{W}/\text{cm}^2$ 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*; 09 23.02, *BACnet Direct Digital Control Systems 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*; 09 23.02, *BACnet Direct Digital Control Systems 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*; 09 23.02, *BACnet Direct Digital Control Systems for HVAC and Other Building Control Systems*; 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

Not used

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

Not used.

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
- h. Carbon Monoxide

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.

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

Not used.

D409002 FOAM GENERATING EQUIPMENT

Not used.

D409003 CLEAN AGENT SYSTEMS

Not used.

D409004 HOOD & DUCT FIRE PROTECTION

Not used.

-- End Of Section --

SECTION D50

ELECTRICAL 12/18

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 Unifomat 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 3-575-01	Lightning and Static Electricity Protection Systems
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 51 00	Interior Lighting
UFGS 27 10 00	Building Telecommunications Cabling Systems
UFGS 28 20 00.00 20	Electronic Security System (ESS), Commercial

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 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 1.3.4 Material Standards

Ensure service support and provide manufacturer's nameplate in accordance with PTS Section Z10, *General Performance Technical Specification*.

D50 1.3.4.1 Warning Labels

Provide arc flash warning labels in accordance with UFC 3-560-01, *Electrical Safety, O & M*.

D50 1.3.4.2 Field-Required Nameplates

Provide laminated plastic nameplates for each switchboard, switchgear, panelboard, equipment enclosure, motor controller, relay, and switch. Each nameplate must identify the function and, when applicable, the position. Provide melamine plastic nameplates, 0.125 inch (3 mm) thick, white with black center core. Surface 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 1.3.5 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 1.3.6 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 1.3.6.1 Factory Trained Engineer

Provide a factory trained engineer to supervise start-up and testing as required in referenced specifications.

D50 1.3.6.2 Performance Verification Testing

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. 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.

- c. Receptacles - Test GFI receptacles with a UL 1436-certified outlet circuit tester to verify correct operation.
- d. 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.
- e. Telecommunication - Test telecommunications systems in accordance with applicable EIA/TIA requirements.
- f. 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 word 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.
- g. Grounding systems - Test the grounding system in accordance with NETA ATS.
- h. Emergency lighting - Test emergency lighting that is intended for means of egress in accordance with NFPA 101, Section 5-9. Confirm the emergency lighting system operates for a minimum of 90 minutes and emergency illumination satisfies NFPA 101, Section 5-9, specified levels.

D50 1.3.6.3 Acceptance Tests and Inspections

The Government reserves the right to witness all Acceptance Tests and Inspections, review data, and request other such additional inspections and repeat tests as necessary to ensure that the system and provided services conform to the stated requirements.

The Qualified Testing Organization 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.

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 51 00, *Interior Lighting*

UFGS 27 10 00, *Building Telecommunications Cabling Systems*

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.

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

Not used.

D501090 OTHER SERVICE AND DISTRIBUTION

D501090 1.1 SURGE PROTECTIVE DEVICE (SPD)

Not used.

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

Telecommunications systems will be provided for individual office per room requirements documentation. Telecommunications backbone equipment will be located in electrical room and provided with adequate HVAC to ensure reliable operation per relevant UFC sections.

D503002 PUBLIC ADDRESS SYSTEMS

Public address system shall be provided with speakers in common areas and master station in office.

D503003 INTERCOMMUNICATIONS SYSTEMS

Not used.

D503004 TELEVISION SYSTEMS

Not used.

D503005 SECURITY SYSTEMS

Not used.

D503006 INDUSTRIAL CONTROL SYSTEMS (ICS)

Not used.

D503090 OTHER COMMUNICATIONS AND ALARM SYSTEMS

D503090 1.1 REMOTE TELEPHONE NOTIFICATION SYSTEM

Provide a remote telephone notification system in all shop areas capable of producing audio/visual notification of incoming phone call on telephone line installed in office.

D5090 OTHER ELECTRICAL SERVICES

Not used.

D509001 GENERAL CONSTRUCTION ITEMS (ELECTRICAL)

D509002 EMERGENCY LIGHTING AND POWER

D509002 1.1 EMERGENCY LIGHTING

Emergency lighting will be provided to comply with most recent editions of NFPA Related codes and Unified Facility Criteria to ensure adequate egress lighting For facility.

D509002 1.2 EMERGENCY GENERATORS

Not used.

D509002 1.3 AUTOMATIC TRANSFER AND BYPASS/ISOLATION SWITCHES

Not used.

D509002 1.4 UNINTERRUPTIBLE POWER SUPPLY (UPS) SYSTEM

Not used.

D509003 GROUNDING SYSTEMS

Provide complete grounding system in compliance with UFC and NEC.

D509004 LIGHTNING PROTECTION

Provide a risk assessment in accordance with NFPA 780 Annex L, Section L-5, Simplified Risk Assessment. If lightning protection is required, provide an LPS in accordance with NFPA 780 criteria, using components manufactured in accordance with UL 96. Due to presence of flammable materials, need for protection should be given serious consideration regardless of the outcome of the risk assessment. Ensure system meets requirements outlined in UFC 3-575-01 Lightning and Static Electricity Protection Systems

D509005 ELECTRIC HEATING

Provide electrical connection to heating systems in accordance with HVAC requirements.

D509006 ENERGY MANAGEMENT CONTROL SYSTEM

Not used.

D509007 PHOTOVOLTAIC ENERGY SYSTEM

Not used.

D509090 OTHER SPECIAL SYSTEMS AND DEVICES

Not used.

D509090 1.1 400 HERTZ SYSTEMS

Not used.

D509090 1.2 STATIC ELECTRICITY PROTECTION SYSTEM

Identify hazardous classified locations in accordance with NFPA 70. Provide grounding and bonding for these areas in accordance with NFPA 77 to support the intended operations.

Include a listing of hazardous materials, containers, and operating units in the design, and indicate fixed operating equipment locations on the drawings. Identify portable and movable equipment requiring static electricity grounding distinctively by location and with type of grounding method each location requires.

Ensure system meets requirements outlined in UFC 3-575-01 Lightning and Static Electricity Protection Systems

--End Of Section--

SECTION E10

EQUIPMENT 12/18

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 [Construction Criteria Base \(CCB\)](#) at the [Whole Building Design Guide Website](#), are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award.

E10 1.2.1 Industry Standards and Codes

Not used.

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)
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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 1.4 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, monorail, and hoist.

E1010 COMMERCIAL EQUIPMENT

Refer to the project program.

E101005 SECURITY & VAULT EQUIPMENT

Not used.

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

Provide the intercom and sound systems, to be coordinated with electrical and data connections (see Section D50, *Electrical*).

E1030 VEHICULAR EQUIPMENT

Not used.

E1040 GOVERNMENT FURNISHED EQUIPMENT

Refer to the project program.

E1090 OTHER EQUIPMENT

E109002 FOOD SERVICE EQUIPMENT

Not used.

E109005 UNIT KITCHENS

Not used.

E109090 OTHER SPECIALIZED FIXED AND MOVABLE EQUIPMENT

Specialized fixed and moveable equipment not described by the other assembly categories.

E109090 1.1 WEAPONS RACKS

Not used.

E109090 1.2 GEAR DRYING CAGES

Not used.

E109090 1.3 PAINT BOOTH

Furnish and install one self-contained paint booth, including all required ventilation, filtration, and automated curing capabilities. Contractor must provide and install a maintenance access stair to include an equipment platform. Doors to the paint booth must have the ability to swing and allow passage of the monorail crane system at both ends. Minimum interior workspace dimensions are 12'-0" wide x 26'-0" long x 12'-0" high.

-- End of Section --

SECTION E20

FURNISHINGS 12/18

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 [Construction Criteria Base \(CCB\)](#) at the [Whole Building Design Guide Website](#), are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the standard at the time of contract award:

E20 1.1.1 Industry Standards and Codes

E20 1.1.2 Government Standards

UNIFIED FACILITIES CRITERIA (UFC)

UFC 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 charrettes, 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.

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:

FF&E Package

E2010 FIXED FURNISHINGS

E201001 FIXED ARTWORK

Not used.

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

Not used.

E201003 SEATING (FIXED)

Not used.

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

Not used.

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 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

Not used.

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

Not used.

E202003 1.4 TRAINING/CONFERENCE ROOM FURNISHINGS

Not used.

E202003 1.5 DINING ROOM FURNISHINGS

Not used.

E202004 RUGS & ACCESSORIES

E202004 1.1 RUGS

Not used.

E202004 1.2 LAMPS

Not used.

E202004 1.3 INTERIOR LANDSCAPING

Not used.

E202004 1.4 OTHER DECORATIVE ITEMS

Not used.

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 as required.

E202090 1.1.3 Small Equipment

Not used.

E202090 1.1.4 Special Equipment

Provide specialty equipment as defined and required.

-- End of Section --

SECTION F10

SPECIAL CONSTRUCTION
12/18

F10 GENERAL

Not Used.

-- End of Section --

SECTION F20

SELECTIVE BUILDING DEMOLITION
12/18

F20 GENERAL

Not Used.

-- End of Section --

SECTION G10

SITE PREPARATION 12/18

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 Construction Criteria Base (CCB) at the Whole Building Design Guide Website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the referenced standard at the time of contract award.

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 23 00.00 20	Excavation and Fill
UFGS 01 57 19	Temporary Environmental Controls
UFGS 01 57 19.01 20	Supplemental Temporary Environmental Controls
UFGS 02 61 13	Excavation and Handling of Contaminated Material
UFGS 02 61 23	Removal and Disposal of PCB Contaminated Soils
UFGS 02 65 00	Underground Storage Tank Removal

G10 1.2 PERFORMANCE VERIFICATION AND ACCEPTABLE TESTING

Compliance with the requirements will be determined by a review of the design and construction submittals and by field inspection. See Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, and Part 2 Section 01 33 00.05 20, *Construction Submittal Procedures*, for additional requirements. Verify earthwork performance via testing detailed in the paragraph, "Field Quality Control", in UFGS Section 31 23 00.00 20, *Excavation and Fill*.

G10 1.3 DESIGN SUBMITTALS

Submit design submittals in accordance with Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, UFC 3-201-01, *Civil Engineering*, and UFC 3-220-01, *Geotechnical Engineering*.

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

UFGS 31 23 00.00 20, *Excavation and Fill*.

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 Section 01 57 19, *Temporary Environmental Controls*.

Submittals in UFGS Section 01 57 19.01 20, *Supplemental Temporary Environmental Controls*.

Submittals in UFGS Section 02 61 13, *Excavation and Handling of Contaminated Material* Submittals in UFGS Section 31 23 00.00 20, *Excavation and Fill*.

Submittals in UFGS Section 02 61 23, *Removal and Disposal of PCB Contaminated Soils*.

Submittals in UFGS Section 02 65 00, *Underground Storage Tank Removal*.

Waste Management Plan in accordance with Part 2 Section 01 74 19.05 20, *Construction and Demolition Waste Management for Design-Build*.

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) Sheet piling 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

Burning is not permitted on-site.

G101001 CLEARING

G101001 1.1 CLEARING

Clear trees, shrubs, brush and vegetation for construction of the project. Clearing includes the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within the areas to be cleared.

G101001 1.2 PRESERVATION

Preserve and protect trees, shrubs and vegetation not directly impacted by the construction in accordance with Part 2 Section 01 57 19, *Temporary Environmental Controls*, and PTS Section G205005, paragraph 1.1 *Existing Plant Material to Remain or be Transplanted*.

G101002 TREE REMOVAL

Remove and dispose of trees to a depth of at least 18 inches (450 mm) below ground surface. Fill depressions with satisfactory material and compact. Mound fill 2 inches (50 mm) above adjacent surface to allow for settling when not part of a subbase.

G101003 STUMP REMOVAL

Remove stumps to a depth of at least 18 inches (450 mm) below ground surface. Fill depressions with satisfactory material and compact. Mound fill 2 inches (50 mm) above adjacent surface to allow for settling when not part of a subbase.

G101004 GRUBBING

Not used.

G101005 SELECTIVE THINNING

Not used.

G101006 DEBRIS DISPOSAL

Prevent spillage on pavements, streets, or adjacent areas. Dispose of surplus and unsuitable material off of Government property.

G1020 SITE DEMOLITION & RELOCATIONS

G1020 1.1 GENERAL

Demolition work includes the demolition, removal and legal disposal of existing construction debris to accommodate the new construction. Take precautions to prevent damages to existing utilities, construction and materials not scheduled for demolition, repair or replacement; repair damages to the construction and materials to the satisfaction of the Contracting Officer and at no additional cost to the Government.

G1020 1.2 AUTHORIZATION

Do not begin demolition until the Demolition Plan has been approved by, and authorization is received from, the Contracting Officer.

G1020 1.3 TITLE TO MATERIALS

Whenever possible, salvage or recycle features demolished in lieu of disposing of as waste in a landfill. Existing features to be demolished which are not salvageable or reused become the property of the Contractor, and must be removed from the project site. The Government will not be responsible for the condition, loss of, or damage to, such property after contract award. Materials and equipment cannot be viewed by prospective purchasers or sold on the site.

G1020 1.4 REUSE OF MATERIALS AND EQUIPMENT

Remove and store materials and equipment to be reused or relocated to prevent damage, and reinstall as the work progresses.

G1020 1.5 SALVAGED MATERIALS AND EQUIPMENT

Deliver salvaged materials and equipment that are to be removed by the Contractor and that are to remain the property of the Government to a storage site on the installation, in accordance with instructions of the Contracting Officer.

G102001 BUILDING MASS DEMOLITION

Not used.

G102002 ABOVEGROUND SITE DEMOLITION

G102002 1.1 DUST AND DEBRIS CONTROL

Prevent the spread of dust and debris to occupied portions of a building or on pavements and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water for dust control if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution. Sweep pavements to control the spread of debris that may result in foreign object damage potential to aircraft.

G102002 1.2 PROTECTION

G102002 1.2.1 Traffic Control

Where pedestrian and driver safety is endangered in the area of removal work, provide traffic control in accordance with FHWA Manual on Uniform Traffic Control Devices (MUTCD).

G102002 1.2.2 Foreign Object Damage (FOD)

Remove potential FOD debris and waste materials on or adjacent to operational airfield pavements due to the Contractor's operations. Install a temporary barricade at the Contractor's expense. The barricade is required to include a fence covered with a fabric designed to stop the spread of debris. Anchor the fence and fabric to prevent displacement by winds or jet/prop blasts. Remove barricade when no longer required.

G102002 1.2.3 Existing Work

Protect existing work that is to remain in place, be reused, or remain the property of the Government. At no additional expense to the Government, repair items that are damaged during performance of the work to original condition, or replace with new. Do not overload pavements to remain.

G102002 1.3 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

Not used.

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

Not used.

G102007 SITE CLEANUP

Remove rubbish and debris from the installation daily; do not allow accumulations inside or outside the building(s) or on pavements. Store materials that cannot be removed daily in areas specified by the Contracting Officer.

G102007 1.1 SPILLS

In the event of a spill or release of hazardous substances, pollutant, contaminant or oil, notify the Contracting Officer immediately. Take immediate containment actions to minimize the effect of any spill or leak in accordance with the ESR and the approved spill work plan as described in Part 2 Section 01 57 19, *Temporary Environmental Controls*. Perform clean up at no additional expense to the Government.

G1030 SITE EARTHWORK

G1030 1.1 GENERAL

This section includes the design and construction requirements for earthwork and grading related to construction of the roadways, parking, paved areas and other related sitework. Refer to Section A10, *Foundations*, for earthwork related to construction of structures, including building, footings, foundations, retaining walls, slabs, tanks, and utility appurtenances.

The Designer of Record is required to utilize UFGS Section 31 23 00.00 20, *Excavation and Fill*, for the project specification, and to submit the edited specification section as a part of the design submittal for the project.

G103001 GRADING

Provide site grading in accordance with the requirements of UFC 3-201-01, *Civil Engineering*.

G103001 1.1 ELEVATIONS

Establish finish floor elevations in accordance with UFC 1-200-01, *DoD Building Code (General Building Requirements)*, and UFC 3-101-01,

Architecture.

G103001 1.2 SITE GRADING

Grade the site such that associated storm water runoff does not adversely affect surrounding sites. Preserve natural topographic features to minimize the impact on the existing drainage patterns at and adjacent to the site.

G103001 1.3 FINISHED SURFACES

Provide finish grading with drainage towards new and existing drainage features and with no resulting low spots that hold water or that direct runoff towards new or existing facilities or site amenities.

G103001 1.4 RODENT AND VEGETATION CONTROL

Prevent and eliminate standing water.

G103002 COMMON EXCAVATION

Preserve natural topographic features to minimize cut and fill requirements. Unsuitable material and surplus excavation becomes the property of the Contractor, and must be disposed of as indicated in the Project Program.

G103003 ROCK EXCAVATION

Blasting is not allowed.

Do not make requests for additional compensation for degree of hardness or difficulty encountered in removal of material. Unsuitable material and surplus excavation becomes the property of the Contractor, and must be disposed of as indicated in the Project Program.

G103004 FILL & BORROW

G103004 1.1 SOURCES

Where sufficient topsoil and satisfactory materials are not available on the project site, provide suitable borrow materials.

G103004 1.2 REQUIREMENTS FOR OFF SITE SOIL

Test off-site soil in accordance with UFGS Section 31 23 00.00 20, *Excavation and Fill*, section titled "Requirements for Off Site Soil".

G103004 1.3 UNSATISFACTORY SOIL MATERIALS

Remove uncontaminated unsatisfactory soil materials from the site. Unsatisfactory materials are materials which do not comply with the requirements for satisfactory materials. Unsatisfactory materials also include man-made fills, trash, refuse, backfills from previous construction or material classified as satisfactory which contains root and other organic matter, frozen material, and stones larger than 3 inches. The Contracting Officer shall be notified of any contaminated materials.

G103004 1.4 TOPSOIL

Refer to Section G2050, "Landscaping". Remove unsatisfactory, existing topsoil from the site in accordance with the Project Program.

G103005 COMPACTION

Provide compaction in accordance with UFGS Section 31 23 00.00 20, *Excavation and Fill*, and the recommendations of the Contractor's Geotechnical Engineer, whichever is greater.

G103006 SOIL STABILIZATION

Provide soil stabilization designed to function as required by site conditions in accordance with the State Highway specifications and standards in the state where the project is located. Apply and install geosynthetics in accordance with the manufacturer's written instructions.

G103007 SLOPE STABILIZATION

Not used.

G103008 SOIL TREATMENT

G103008 1.1 TERMITE CONTROL

Refer to Section A1010 1.2, "Termite Control".

G103009 SHORING

Provide sheeting, shoring, bracing, cribbing and underpinning in accordance with the Army Corps of Engineer's Safety and Health Requirements Manual (COE EM 385-1-1), UFC 3-220-01, *Geotechnical Engineering*, UFC 3-301-01, *Structural Engineering*, and other Federal, State and local codes and requirements.

Provide protection of existing structures.

G103010 TEMPORARY DEWATERING

The design of the temporary dewatering system is required to account for soil conditions, rainfall, fluctuations in the groundwater elevations and the potential settlement impact on adjacent facilities due to dewatering. Provide dewatering in accordance with UFGS Section 31 23 00.00 20, *Excavation and Fill*. While the excavation is open, maintain the water level continuously, at least 1.0 foot (0.30 m) below the working level.

French drains, sumps, ditches or trenches are not allowed within 3 feet (0.9 m) of the foundation of any structure without written approval of the Government's Civil/Geotechnical Reviewer.

G103011 TEMPORARY EROSION & SEDIMENT CONTROL

G103011 1.1 TEMPORARY EROSION & SEDIMENT CONTROL

Develop and implement temporary erosion and sediment control measures and other Best Management Practices (BMPs) prior to or in conjunction with

commencement of earthwork in accordance with the state Erosion and Sediment Control Laws and Regulations. Remove non-permanent erosion control measures after vegetation is fully established.

G103011 1.2 MAINTENANCE

Maintain temporary erosion control measures in accordance with state Erosion and Sediment Control Laws and Regulations throughout the project until areas are fully stabilized.

G103090 OTHER SITE EARTHWORK

Not used.

G1040 HAZARDOUS WASTE REMEDIATION

Not used.

-- End of Section --

SECTION G20

SITE IMPROVEMENTS 12/18

G20 GENERAL

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

G20 1.1 DESIGN GUIDANCE

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

Industry standards, codes, and Government standards referenced in the section text that are not found in the Unified Master Reference List (UMRL) in the Construction Criteria Base (CCB) at the Whole Building Design Guide Website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the referenced standard at the time of Contract award.

G20 1.1.1 Industry Standards and Codes

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

AMERICAN SOD PRODUCERS ASSOCIATION (ASPA)

U.S CONSUMER PRODUCT SAFETY COMMISSION, PUBLICATION NO. 325

Refer to UMRL for reference designation identification.

G20 1.1.2 Government Standards

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS RR-F-191	Fencing and Wire and Post Metal (and Gates, Chain-link Fence Fabric, and Accessories)
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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
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	UFC(s): UFC 1-200-02, High Performance and Sustainable Building Requirements, UFC 3-201-01, Civil Engineering, UFC 3-201-02, Landscape Architecture, UFC 3-210-01, Low Impact Development, UFC 3-220-01, Geotechnical Engineering
UFC 3-250-01	Pavement Design for Roads and Parking Areas
UFC 3-270-01	O&M Manual: Asphalt and Concrete Pavement Maintenance and Repair
UFC 3-270-02	Asphalt Crack Repair
UFC 3-270-03	Concrete Crack and Partial Depth Spall Repair
UFC 3-270-04	Concrete Repair
UFC 4-022-02	Selection and Application of Vehicle Barriers
UFC 4-022-03	Security Fences and Gates

G20 1.2 QUALITY ASSURANCE

G20 1.2.1 Qualifications of Tree Location Contractor

Contractor is required to be a professional tree moving company holding Landscape Contractor's license in the state where the work is to be performed and have a minimum ten years of tree relocation experience. Contractor must be a Certified Arborist certified by the International Society of Arboriculture. Arborist is required to oversee all tree moving operations during construction.

G20 1.2.2 Qualifications of New Landscape Contractor

Construction company must hold a Landscape Contractor's license in the state where the work is to be performed and have a minimum five years of landscape construction experience.

G20 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Compliance with the requirements will be determined by a review of the design and construction submittals and by field inspection. See Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, and Part 2 Section 01 33 00.05 20, *Construction Submittal Procedures*, for additional requirements.

Verify satisfactory performance via Performance Verification, as detailed in this section of the RFP. Verify satisfactory performance also via testing as detailed in the paragraph, Field Quality Control, in UFGS Specification Sections utilized.

G20 1.3.1 Subgrade Preparation Performance Verification

Perform subgrade preparation in accordance with PTS Section G10. If required by the Designer of Record, perform proof rolling. Perform proof rolling in the presence of the Contracting Officer. Rutting or pumping of material is required to be undercut and replaced with satisfactory soil materials as defined in Section G10, *Site Preparation*.

G20 1.3.2 Base Course Performance Verification

G20 1.3.2.1 Aggregate Base Course

- a. Sampling: ASTM D75/D75M.
- b. Gradation: ASTM C136.
- c. Thickness: Confirm in-place compacted thickness. Acceptable tolerances are plus or minus 0.5 inches (13 mm). One test for every 500 square yards (418 square meters); minimum 2 tests.
- d. Density: ASTM D1556 or ASTM D6938. One field test for every 1000 square yards (836 square meters); minimum 2 tests. ASTM D1557, Method A, B or C; one laboratory test for the project.
- e. Visual: Provide smooth surface with no ruts.

G20 1.3.2.2 Other Types of Base Courses

For other types of base courses, provide field testing in accordance with the SHS.

G20 1.3.3 Bituminous Concrete Pavement Performance Verification

- Visual: Provide finished surface that is uniform in texture and appearance and free of cracks and creases.
- Sampling: ASTM D979.
- Job Mix: Determine gradation and bitumen content. One sample for every 400 tons (362,500 kilograms); minimum 1 test.
- Thickness: ASTM D3549. Confirm in-place compacted thickness. Acceptable tolerances are plus or minus 0.5 inches (13 mm) for bituminous base course and plus or minus 0.25 inches (6 mm) for bituminous surface course. One test for every 500 square yards (418 square meters); minimum 2 tests.
- Surface Smoothness: Test surface smoothness by using a 10 foot (3 meter) straightedge in transverse and longitudinal directions to pavement. Acceptable tolerances are plus or minus 0.25 inches (6 mm) for bituminous base and surface courses.
- Density: Conduct field density of in-place compacted pavement in accordance with ASTM D2950 and correlated with ASTM D1188 or ASTM D2726/D2726M. One field test for every 1000 square yards (836 square meters); minimum 2 tests. One laboratory test for the project.

G20 1.3.4 Portland Cement Concrete Pavement Performance Verification

- Visual: Provide finished surface that is uniform in texture and appearance and free of cracks.
- Sampling: ASTM C31/C31M.

- Thickness: Acceptable tolerances are plus or minus 0.5 inches (13 mm). One test for every 500 square feet (418 square meters); minimum 2 tests.
- Surface Smoothness: Test surface smoothness by using a 12 foot (3.6 meter) straightedge in transverse and longitudinal directions to pavement. Provide finished surfaces of the pavements with no abrupt change of 0.71 inch (18 mm) or more.
- Strength: Samples for strength tests of each mix design of concrete placed each day are required to be taken not less than once a day, nor less than once for each 100 cubic yards (120 cubic meters) of concrete, nor less than once for each 5000 square feet (500 square meters).

1) Compressive Strength: ASTM C39/C39M. Make five test cylinders for each set of tests. Test two cylinders at 7 days, two cylinders at 28 days, and hold one cylinder in reserve. Determine each strength test result by the average of two cylinders from the same concrete sample tested at 28 days. If the average of any three consecutive strength test results is less than f'_c or if any strength test result falls below f'_c by more than 500 psi, take a minimum of three ASTM C42/C42M core samples from the in-place work represented by the low test cylinder results and test. Consider the concrete represented by core test structurally adequate if the average of three cores is equal to at least 85 percent of f'_c and if no single core is less than 75 percent of f'_c . Retest locations represented by erratic core strengths.

2) Flexural Strength: ASTM C78/C78M. Make four test specimens for each set of tests. Test two specimens at 28 days, and the other two at 90 days. Concrete strength will be considered satisfactory when the minimum of the 90-day test results equals or exceeds the specified 90-day flexural strength, and no individual strength test is less than the design strength. If the ratio of the 28-day strength test to the specified 90-day strength is less than 65 percent, make necessary adjustments for conformance. Remove concrete not meeting strength criteria and provide new acceptable concrete at no expense to the Government. Repair core holes with nonshrink grout. Match color and finish of adjacent concrete.

G20 1.3.5 Concrete Joint Performance Verification

Install a test section of 500 linear feet (150 m) at start of sealing operation for each sealant to be used. Obtain approval of test section by Contracting Officer prior to installing additional joint seal. Reject joint sealer that fails to cure properly, or fails to bond to joint walls, or reverts to uncured state or fails in cohesion, or shows excessive air voids, blisters, or has surface defects, swells, or other deficiencies, or is not recessed within indicated tolerances. Remove rejected sealer and reclean and reseal joints.

G20 1.3.6 Topsoil Performance Verification

Prior to planting design, provide a commercial soil analysis. Amend planting areas based on the soil test's interpretation, amendment type, and quantity recommendations (including soil nutrients and texture, with percentages shown). Use additional topsoil only in

areas where soil analysis shows that the existing soil is inadequate for growth of plant materials.

G20 1.3.7 Final Inspection for Planting and Irrigation

Request the final inspection in writing at least 10 days prior to the last day of the planting and irrigation Establishment Period. The Landscape Contractor must attend the inspection with the Contracting Officer and document the inspection. The Landscape Architect-of-Record must also attend the inspection and provide the Contracting Officer with a letter certifying that the planting and irrigation is installed per the plans and irrigation coverage is correct and appropriate for optimum plant survival. At the end of the Establishment Period, remove stakes and guy cables.

G20 1.3.8 Landscape and Irrigation Establishment Period and Guarantee

Guarantee transplanted trees, newly planted vegetation and irrigation systems for a period of one year after the Contracting Officer's final acceptance. This acceptance, and the submittal of irrigation as-builts and controller charts, begins the Establishment Period. Replace trees, shrubs, and ground covers that die or have 20 percent or more of their crowns that die during planting operations or the guarantee period with healthy plants of the same species or variety during the appropriate planting season. The Landscape Architect-of-Record must, along with the Contracting Officer, attend, approve and document the start of the Establishment Period and document quarterly and final inspections. The Landscape Architect of Record must document quarterly and final inspections by submitting written reports with photographs to the Contracting Officer. During this period, perform tasks including, but not limited to: watering, mowing, overseeding, fertilizing, mulching, pruning, weeding, eradicating pests (rodents, rabbits, insects, mammals and fungus), restaking, adjusting guy wires, adjusting irrigation systems, maintaining erosion control materials, removing dead or broken branches by pruning in accordance with ANSI A300 Part 1, maintaining edging of planter beds, checking for girdling of trees, removal of trash and debris, and replenishing mulch to assure plant material is in a healthy and thriving condition or replace plant material at Contractor's expense. Reseed broadcast seeded or hydro-seeded areas that do not achieve the 95-percent coverage by the end of the Establishment Period by the same method and maintain an additional 120 days to ensure coverage requirements are met. Maintain turf in a manner that promotes proper health, growth, rich natural green color, and a neat, uniform, manicured appearance, free of bare areas, ruts, holes, weeds, pests, dead vegetation, debris, and unwanted vegetation that present an unsightly appearance. Mow weekly during the growing season and remove excess clippings.

G20 1.4 DESIGN SUBMITTALS

Submit design submittals in accordance with UFC 1-200-01, *DoD Building Code (General Building Requirements)*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine Corps Design Procedures*, and UFC 3-201-01, *Civil Engineering*.

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

32 11 16.13, *Sand-Clay [Base] [Subbase] Course*

32 11 16.16, *[Base Course for Rigid] [and Subbase Course for Flexible] [Subbase Course for Pervious] Paving*

32 11 24, *Graded Crushed Aggregate Base Course for [Pervious][Flexible] Pavement*

32 11 26.16, *Bituminous Concrete Base Course*

32 11 33, *Cement Stabilized [Base] [Subbase] Course at Airfields and Roads*

32 11 36.13, *Lean Concrete Base Course*

32 12 17, *Hot Mix Bituminous Pavement*

32 13 13.06, *Portland Cement Concrete Pavement for Roads and Site Facilities*

32 13 43, *Pervious Concrete Paving*

32 16 15, *Concrete Block Pavements*

G20 1.5 CONSTRUCTION SUBMITTALS

Submit a transplanting plan for projects which include transplanting trees. Submit the plan showing existing and proposed locations of transplanted trees. Include in the plan delineate methods and times for root pruning, digging, balling, removing, storing, transporting, planting, watering, and maintenance to ensure survivability. Include also in the plan equipment, anti-desiccant, and pesticides to be used. Provide a listing of the plant material to be transplanted by common name and botanical name as listed under "Nomenclature" in ANSI Z60.1; classification; caliper; and height.

G20 1.5.1 Transplanting Plan

Submit a transplanting plan for projects which include transplanting trees. Submit the plan showing existing and proposed locations of transplanted trees. Include in the plan delineate methods and times for root pruning, digging, balling, removing, storing, transporting, planting, watering, and maintenance to ensure survivability. Include also in the plan equipment, anti-desiccant, and pesticides to be used. Provide a listing of the plant material to be transplanted by common name and botanical name as listed under "Nomenclature" in ANSI Z60.1; classification; caliper; and height.

G20 1.5.2 As-Builts

Submit a complete set of irrigation as-builts to the Contracting Officer, to include the recording of measurements onto a record set of full-size project irrigation plans. Indicate measurements for locating water meters, pressure supply lines at 100 foot (30 m) intervals, backflow prevention devices, rain/freeze sensors, valves (including quick couplers and hose bibbs), controllers (and control wire, if routed separately from pressure supply line); dimensioned from two permanent points of reference, such as building corners, sidewalks, and other permanent features.

G20 1.6 ANTITERRORISM (AT) STANDARDS

Incorporate the minimum AT standards indicated in UFC 4-010-01, *DoD Minimum Antiterrorism Standard for Buildings*.

G20 1.7 PROJECT LIMITATIONS

Prior to the start of design, determine the exact limit-of-work line for the project periphery, considering items such as, but not limited to, utility work, landscape areas, and laydown areas. See PTS G2050 for limits of landscape areas.

G2010 ROADWAYS

G2010 1.1 PAVEMENT DESIGN

Provide geometric and pavement design, including minimum pavement sections, in accordance with UFC 3-201-01, *Civil Engineering*, and the State Department of Transportation. Provide pavement calculations in accordance with FC 1-300-09N, *Navy and Marine Corps Design Procedures*. Provide any required additional pavement design to provide a complete and useable facility.

For pavements subject to aircraft traffic or aircraft ground support equipment traffic consult Government Civil Reviewer for design criteria and requirements. State Department of Transportation standards are not acceptable for airfield pavements.

G2010 1.2 PAVEMENT AESTHETICS

Provide surfaces consistent in color and finish.

G2010 1.3 TRAFFIC CONTROL DEVICES

Provide and install new traffic control devices (i.e., signs and markings) in accordance with the United States Department of Transportation Federal Highway Administration's *Manual on Uniform Traffic Control Devices* and their standard, "Rigid Sign Supports". Also provide new traffic control devices along/in the existing streets adjacent to the project site as necessary to provide complete traffic control to the new facilities.

G2010 1.4 EXISTING UTILITY STRUCTURES

Adjust existing utility structures to meet the new finished pavement grades as required.

G201001 BASES & SUBBASES

Prepare subgrade in accordance with Section G10, *Site Preparation*. Use geotextiles for separation or reinforcement in accordance with manufacturer's instructions. Provide base course under paved areas in accordance with the State Highway specifications (SHS) in the state where the project is located.

Place base course in accordance with the SHS for that particular base course and in layers of equal thickness with no compacted layer more than 6 inches (150 mm) thick. Compact base course at optimum moisture content to 100 percent ASTM D 1557 maximum dry density.

Where SHS are not available or applicable, the Designer of Record must utilize the UFGS Specification Sections referenced under paragraph 1.1.2 entitled "Government Standards" for the project specification. Submit these specifications in edited form as a part of the design submittal for the project.

G201002 CURBS & GUTTERS

Provide concrete curbs and gutters in accordance with the SHS and standards or as specified in UFC 3-201-01, *Civil Engineering*, whichever is more stringent. Where the SHS do not include concrete materials for curbs and gutters, provide concrete in accordance with the standard mix of the SHS for a minimum compressive strength at 28 days of 3500 psi (25 MPa) concrete.

G201003 PAVED SURFACES

Where SHS are not available or applicable, the Designer of Record must utilize the UFGS Specification Sections referenced under paragraph 1.1.2 entitled "Government Standards" for the project specification. Submit these specifications in edited form as a part of the design submittal for the project.

G201003 1.1 PAVEMENT MIX

G201003 1.1.1 Bituminous Concrete Pavement

Provide bituminous concrete pavement in accordance with the standard mix of the SHS based on the pavement design and vehicle loading indicated in this RFP.

G201003 1.1.1.1 Bituminous Concrete Placement

Provide bituminous concrete placement, including minimum temperature during placement, joints, and maximum lift thickness in accordance with the SHS. Compact bituminous concrete in accordance with the SHS, modified to 96 percent of maximum laboratory density.

G201003 1.1.2 Portland Cement Concrete Pavement

If reinforced, provide the welded wire fabric in conformance to ASTM A185. Provide bar reinforcement in conformance to ASTM A615/A615M, Grade 400 (Grade 60).

Provide concrete in accordance with the standard mix of the SHS for the design strength required by UFC 3-201-01, *Civil Engineering*, plus

allowable deviations. Unless noted otherwise in Part 3 or Part 6, provide a minimum compressive strength at 28 days of 3500 psi (25 MPa) concrete.

If required for sustainability goal, provide Portland cement concrete pavement with a Solar Reflectance Index (SRI) greater than or equal to 29.

G201003 1.2 JOINTS FOR PORTLAND CEMENT CONCRETE PAVEMENT

Provide joints in accordance with SHS and UFC 3-250-01, *Pavement Design for Roads and Parking Areas*. Install joints in a manner and at such time to prevent random or uncontrolled cracking. Locate joints to form a regular rectangular pattern. Wherever curved pavement edges occur, make joints to intersect tangents to curve at right angles.

G201003 1.2.1 Expansion Joints

Provide thickened edge expansion joints at the intersection of two rigid pavements. Use preformed joint filler, ASTM D1751. Provide filler that is compatible with joint sealer material. Hold preformed joint filler in position during concreting operations.

G201003 1.2.2 Isolation Joints

Provide thickened edge isolation joints by placing a 1/2-inch (12 mm) preformed joint filler (ASTM D 1751) around each structure that extends into or through the pavement before concrete is placed at that location.

G201003 1.2.3 Contraction Joints

Saw joint lines within specified tolerance, straight, and extend for width of transverse joint, and for entire length of longitudinal joint.

G201003 1.2.4 Construction Joints

If an emergency stop occurs remove the concrete back to location of transverse joint and install a construction joint.

G201003 1.2.5 Joint Sealants

ASTM D5893/D5893M; provide single component cold-applied silicone. Provide a self-leveling and non-acid curing silicone sealant.

G201003 1.2.6 Preformed Compression Seals

Use preformed compression seals in areas where silicone joint sealant does not perform, such as areas subject to water inundation, blasts, or constant/repeated fuel spillage.

ASTM D 2628. ASTM D 2835, for lubricant.

G201003 1.3 PRIME COAT

Use prime coat in accordance with the SHS. Use emulsified asphalt for prime coat materials.

G201003 1.4 TACK COAT

Tack coat is required for bituminous pavement overlays and on vertical cut faces of pavement patches. Provide tack coat in accordance with the SHS.

G201003 1.5 PAVEMENT PATCHES

Provide pavement patches for existing pavements where required for installation of utility trenches. Sawcut 12 inches beyond edge of trench. Provide thicknesses of pavement materials equal to or greater than the existing pavement section.

For spalls or repairs of existing concrete pavement, perform repairs in conformance with UFC 3-270-03, *Concrete Crack and Partial Depth Spall Repair*, and UFC 3-270-04, *Concrete Repair*. Provide spall repair materials that are either Rapid Setting Cementitious Concrete (RSCC), epoxy concrete, or polymer-modified Portland Cement (non-sag mortar) products specially formulated for spall repairs, with a proven record (in service at least three years) of satisfactory use under loading and environmental conditions similar to those at the location of intended use. Provide a manufacturer's data sheet and certificate supporting the satisfactory use to the Contracting Officer with the design. A product manufacturer's representative is required to be present during the initial two days of product application to verify that manufacturer's instructions for use are adhered to by the Contractor. Give the Contracting Officer 7 days notice prior to the initial application in order to be present.

G201004 MARKING & SIGNAGE

G201004 1.1 MARKING

Provide pavement markings in accordance with the SHS. Design materials for life expectancy of at least 3 years under an average daily traffic count per lane of approximately 9000 vehicles. Water based paints must have durability rating of at least 4 when determined in the wheel path area.

Provide a half-rate initial marking application on bituminous pavements. Provide the remaining application at the end of the normal curing period.

G201004 1.2 SIGNAGE

Provide signage in accordance with the Manual on Uniform Traffic Control Devices (MUTCD).

G201005 GUARDRAILS & BARRIERS

G201005 1.1 GUARDRAILS

Not used.

G201005 1.2 BOLLARDS

For bollards to prevent damage, provide minimum 4 feet height, 4 inch

diameter steel pipe filled with concrete, painted, and embedded in a portland cement concrete foundation.

For bollards located at building entries or other high-visibility areas provide decorative bollards matching the design of the facility or consistent with the Base Exterior Architecture Plan (BEAP) and the Installation Appearance Plan.

Bollards for security are specified in Section G204004, "Security Structures".

G201006 RESURFACING

Adjust rims of existing utility structures to match proposed grades after resurfacing.

G201006 1.1 SLURRY SEAL

ASTM D 3910 and in accordance with the SHS.

G201006 1.2 BITUMINOUS CONCRETE OVERLAY

Remove old pavement by cold milling to depths required to provide new surface and leave underlying materials intact. Clean the pavement of excessive dirt, clay or other foreign matter with power brooms and hand brooms immediately prior to the milling operation.

Repair or replace damaged utility structures, valve boxes, or pavement that is torn, cracked, gouged, rutted, broken or undercut at no additional expense to the Government.

Provide bituminous concrete overlay produced from hot or cold recycling of the milled material or from virgin materials in accordance with the provisions of UFC 3-201-01, *Civil Engineering*, and the standard mix of the SHS based on the pavement design and vehicle loading as indicated in this RFP.

G201006 1.3 CRACK SEALING

Use fiber reinforced crack sealer for sealing cracks in asphalt pavement after milling and prior to resurfacing. Provide crack sealing conforming to the following requirements in UFC 3-270-01, *Asphalt Maintenance and Repair*, and UFC 3-270-02, *Asphalt Crack Repair*.

G201090 OTHER ROADWAYS

Not used.

G2020 PARKING LOTS

Refer to Section G2010.

G2020 1.1 PERMEABLE PAVEMENT

Provide permeable concrete pavers of solid interlocking paving units

complying with ASTM C936, resistant to freezing and thawing when tested according to ASTM C67, and made from normal-weight aggregates. If required for sustainability goal, provide permeable concrete pavers with a Solar Reflectance Index (SRI) greater than or equal to 29.

Provide pervious concrete in accordance with UFGS Section 32 13 43, *Pervious Concrete Paving*.

Do not use asphalt-surfaced porous pavement.

G202001 BASES & SUBBASES

Refer to Section G201001.

G202002 CURBS & GUTTERS

Refer to Section G201002.

G202003 PAVED SURFACES

Refer to Section G201003.

G202004 MARKING & SIGNAGE

Refer to Section G201004. Provide water-based paints only.

Mark to denote traffic lanes and parking spaces; mark in accordance with the requirements of UFC 3-201-01, *Civil Engineering*.

G202005 GUARDRAILS & BARRIERS

Refer to Section G201005.

G202005 1.1 WHEELSTOPS

Provide precast concrete wheelstops.

G202006 RESURFACING

Not used.

G2030 PEDESTRIAN PAVING

Locate new sidewalks such that they maintain continuity of pedestrian traffic to and from the existing sidewalks adjacent to the site(s).

G203001 BASES & SUBBASES

Provide as required by local standards or geotechnical report.

G203003 PAVED SURFACES

G203003 1.1 SIDEWALKS

Provide sidewalks of Portland cement concrete pavement with 4 inches (100 mm) thick minimum or permeable pavement. Provide concrete and permeable

pavement in accordance with Section G201003 and G2020, respectively. For PCC sidewalks, provide a broomed finish. Provide sidewalks of at least 5 feet (1.5 meters) wide, except that sidewalks connecting entry points of housing units to the housing unit's parking are required to be at least 36 inches (900 mm) wide. In housing areas, offset sidewalks paralleling streets to maintain a minimum grassed separation of 5 feet (1.5 meters) from the back face of the curb to the closest edge of the sidewalk.

Unless indicated otherwise, provide a transverse slope of 1/48. Limit variation in cross section to 0.25 inch in 5 feet (6 mm in 1.50 m).

Submit samples boards in accordance with ESR G2050 and PTS G2050 and finish schedule on final plans.

G203003 1.1.1 Joints for PCC Pavement Sidewalks

Provide contraction joints spaced at intervals equivalent to the width of the sidewalk. Provide 0.5 inch (13 mm) thick transverse expansion joints at changes in direction where sidewalk abuts curb, steps, rigid pavement, or other similar structures; space expansion joints every 50 feet (15 m) maximum. Provide isolation joints by placing a 1/2-inch (12 mm) preformed expansion joint filler around each structure that extends into or through the sidewalk before concrete is placed at that location.

G203003 1.2 CONCRETE PAVERS

ASTM C936. Install in accordance with manufacturers recommendations.

G203003 1.3 HANDICAPPED RAMPS

Provide handicapped ramps of PCC pavement with an exposed aggregate finish, truncated domes, or as required by the SHS at roadway intersections.

G203004 GUARDRAILS & BARRIERS

Not used.

G2040 SITE DEVELOPMENT

G204001 FENCING & GATES

G204001 1.1 CHAIN LINK FENCE

Provide chain link fence designated as security fencing in accordance with paragraph G204001 - 1.3.

Provide chain link fence fabric that is at least 9 gauge (3 mm) steel wire mesh material (before coating) with mesh openings not larger than 2 inches (51 mm). Do not use aluminum fabric, posts or accessories. Install fence in accordance with ASTM F567 and the manufacturer's written installation instructions.

G204001 1.1.1 Tensions Wires and Top Rails

Provide rails in accordance with FS RR-F-191/3, Class 1, steel pipe,

Grade A.

G204001 1.1.2 Gates

Provide gates in accordance with FS RR-F-191/2 with posts and fabric as specified for fence.

G204001 1.1.3 Posts and Braces

Provide posts and braces in accordance with FS RR-F-191/3, Class 1, steel pipe, Grade A. Brace each gate, terminal and end post with truss rods.

G204001 1.1.4 Fencing Accessories

Provide fencing accessories in accordance with FS RR-F-191/4. If PVC coating is required, provide accessories with PVC color coating similar to that specified for chain-link fabric or framework.

G204001 1.2 ORNAMENTAL FENCE

Not used.

G204001 1.3 SECURITY FENCE

Provide security fencing systems in accordance with UFC 4-022-03, *Security Fences and Gates*, and this RFP.

G204001 1.3.1 Chain Link Security Fence

Provide chain link fence in accordance with paragraph G204001 - 1.1, excepted as noted otherwise. Ensure that the fabric has twisted and barbed selvage at the top and bottom. Do not provide top rails. Locate posts and structural supports on the inner side of the fencing. Install outriggers facing outward except when the fence is mounted directly on the property line.

G204001 1.3.2 Signage

Provide signage at a minimum of 200 foot (61 m) intervals along the entire perimeter.

G204001 1.3.3 Drainage Culverts and Utility Openings

Provide protective measures to prevent access through culverts, storm drains, sewers, air intakes, exhaust tunnels and utility openings or across drainage ditches or swales in accordance with UFC 4-022-03.

G204001 1.4 OPENINGS IN PERIMETER AND SECURITY FENCING

Do not cover, block or lace openings in perimeter fencing and security fencing with material which would prevent a clear view of personnel, vehicles or material in the outer or inner vicinity of the fence line.

G204001 1.5 FENCE GROUNDING

Ground and bond the fence in accordance with the National Electric Safety Code (NESC) - IEEE C2 and UFC 4-022-03. Ground fencing on either side of every gate and at other locations when the fencing is near and parallel to high tension power lines. Grounding is also required at intervals of 1000 feet (305 meters) to 1500 feet (457 meters) when the fencing runs through isolated areas and at lesser distances depending on the proximity of the fencing to public roads, highways and buildings where the fencing is around or within explosive storage, production, operating or handling areas.

G204001 1.6 ENCLOSURES FOR UTILITY EQUIPMENT

Where fencing is used to provide an enclosure for utility equipment, ensure a minimum clearance is provided no less than 3 feet (900 mm) around the equipment to permit maintenance access and ventilation. Provide stone, gravel or concrete paving within the enclosure.

G204002 RETAINING WALLS AND FREESTANDING WALLS

Not used

G204003 EXTERIOR FURNISHINGS

Not used.

G204003 1.1 PICNIC AND PASSIVE RECREATION AREAS

Not used.

G204003 1.2 TRASH RECEPTACLES

Not used.

G204003 1.3 BENCH

Not used.

G204003 1.4 RECYCLING RECEPTACLES

Not used.

G204003 1.5 BARBEQUE

Not used.

G204003 1.6 HOT ASH RECEPTACLE

Not used.

G204004 SECURITY STRUCTURES

Not used.

G204005 SIGNAGE

Provide facility signage in accordance with local code, the Installation and Appearance Guide, the Base Exterior Architectural Plan (BEAP) and this RFP.

Size messages and graphics on signs according to the functional viewing distance. Typically, at least 1 inch (25 mm) of letter height per 25 feet (7.62 meters) of viewing distance is required for readability.

Refer to Section G201004, "Marking & Signage" for traffic signage.

G204007 PLAYING FIELDS

G204007 1.1 PLAYGROUNDS

Not used.

G204007 1.1.1 Tot Lots

Not used.

G204007 1.1.2 Play Lots

Not used.

G204007 1.1.3 Equipment

Not used.

G204007 1.1.4 CCA-Treated Lumber

Not used.

G204007 1.1.5 Playground Safety Surface

Not used.

G204007 1.2 PLAYING FIELDS

Not used.

G204090 OTHER SITE IMPROVEMENTS

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G204090 1.1 DUMPSTER PADS AND ENCLOSURES

Not used.

G2050 LANDSCAPING

Landscape area is defined as permeable areas within the project boundaries not covered by buildings, roads, parking lots, sidewalks, and other non-permeable areas. Provide landscape improvements to all site areas disturbed by construction.

G2050 1.1 DESIGN

Design landscaped areas in accordance with Presidential Executive Order 13148 of April 2000, with a goal to reduce fertilizers, pesticides, and water use. The intent is to achieve a base-wide ratio of 20 percent maximum non-native plants and 80 percent minimum locally or regionally native plants. Do not use plants deemed invasive by the project state or region's Exotic Pest Plant Council, State Department of Agriculture or local chapter of the American Society of Landscape Architects as a threat to ecosystems or agriculture. Select only plant species which require little or no supplemental irrigation after the initial establishment period. Only nursery-grown plants are acceptable. Cover non-paved site areas disturbed by construction operations with plant material or inorganic mulch. Stabilized soil, decomposed granite, and organic mulch are not acceptable as ground covers. Provide landscape architectural work in accordance with UFC 3-201-02, *Landscape Architecture*. For projects with planting or irrigation areas, utilize the design services of a Landscape Architect licensed in the state of the project. The Landscape Architect of Record must visit the site at least once prior to design, twice during construction,

and quarterly during the Establishment Period, including the Establishment Period start and completion. The Landscape Architect of Record must attend the kickoff partnering meeting and CDWs. Courtyards and plazas are to be designed by the Landscape Architect. For the CDW, provide a Site Analysis Plan to demonstrate the design thought process. It is the Contractor's responsibility to coordinate between disciplines including architecture, civil engineering, electrical engineering, mechanical engineering, fire protection, and landscape architecture. Coordinate location of utilities, structures, and equipment. For projects in dry climates (arid and semi-arid), eliminate or minimize the use of turf, except when needed for active or passive recreation.

The Landscape Architect-of-Record is required to submit 5 sample boards of landscape materials. Sample boards to include but not limited to colors, finishes, textures of hardscape paving, walls, signs, monument piers, inorganic mulches, organic mulches, and other site improvements. Include cut sheets of proposed plant material.

G205001 FINE GRADING AND SOIL PREPARATION

See Section G10, *Site Preparation*. Provide 4 inches (102 mm) of topsoil with appropriate soil amendments, as recommended by a current soil composition test, for areas to be planted with turf grass.

G205002 EROSION CONTROL MEASURES

See Section G10, *Site Preparation*.

G205003 TOP SOIL AND PLANTING BEDS

See paragraph titled, G205005 PLANTINGS.

G205004 SEEDING, SPRIGGING, AND SODDING

Hydroseed areas that are to be seeded and are larger than 1,000 square feet (92.90 square meters). Select hydroseed mix composition that is appropriate for surrounding land use and compatible and consistent with local application rates, seed availability and established practice in the project area. If project dates are unknown, specify required planting dates or alternative species for different seasons. Apply seed at a time best suited for germination of the selected species. Seeded areas are required to achieve a 95-percent coverage of the selected species and be weed free at the end of the Establishment Period.

G205005 PLANTINGS

Not used.

G205007 IRRIGATION SYSTEMS

G205007 1.1 IRRIGATION

Not used.

G205007 1.2 OPERATION AND CONTROL

Not used.

G205007 1.3 ZONING

Not used.

G205007 1.4 TEMPORARY IRRIGATION

Not used.

G205007 1.5 NON-POTABLE IRRIGATION

Not used.

G205007 1.5.1 Controller Charts

Not used.

-- End of Section --

SECTION G30

SITE CIVIL/MECHANICAL UTILITIES 12/18

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 Construction Criteria Base (CCB) at the Whole Building Design Guide Website, are listed below for basic designation identification. Comply with the required and advisory portions of the current edition of the referenced standard at the time of Contract award.

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)
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UFC 3-460-01	Design: Petroleum Fuel Facilities
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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

Not used.

G30 1.2.4 Qualifications of Coating Contractors for Water Storage Tanks

Not used.

G30 1.2.5 Qualifications of Oil Interceptor Manufacturers

Not used.

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

Not used.

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 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 1.3.9 Liquid Fuel Distribution Piping Verification Testing

Not used.

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*.

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 Section 01 33 29.05 20 *Sustainability Reporting for Design-Build*.

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 Section 01 50 00.05 20, *Temporary Facilities and Controls for Design-Build*.

G30 1.9 WATER STORAGE TANK

Not used.

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

G301001 1.1 WATER METER

Not used.

G301001 1.2 TEST HOLE

Not used.

G301001 1.3 WELL CONSTRUCTION

G301001 1.3.1 Well Development

Not used.

G301001 1.3.2 Disinfection

Not used.

G301001 1.4 ABANDONMENT OF EXISTING WELLS

Not used.

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

Not used.

G301003 1.2 TANK ACCESSORIES

Not used.

G301003 1.3 TANK COATINGS

Not used.

G301003 1.3.1 Interior Coating System

Not used.

G301003 1.3.2 Exterior Coating System

Not used.

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

Not used.

G301006 NON-POTABLE WATER DISTRIBUTION

Refer to G301002; note that system disinfection is not required.

G301007 PUMPING STATIONS

Not used.

G301008 PACKAGED WATER TREATMENT PLANTS

Not used.

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 ASTM F2764/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. Not used.

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

Not used.

G302005 SEPTIC TANKS

Not used.

G302006 DRAIN FIELDS

Not used.

G302090 OTHER SANITARY SEWER

G302090 1.1 OIL INTERCEPTOR

Not used.

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

Not used.

G303005 HEADWALLS

Not used.

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

Not used.

G3040 HEATING DISTRIBUTION

G304001 OVERHEAD HOT WATER SYSTEMS

G304001 1.1 PIPING & FITTINGS

Not used.

G304001 1.2 INSULATION

Not used.

G304001 1.3 EXPANSION

Not used.

G304001 1.4 SUPPORTS

Not used.

G304002 OVERHEAD STEAM SYSTEMS

G304002 1.1 PIPING & FITTINGS

G304002 1.1.1 Steam Piping

Not used.

G304002 1.1.2 Condensate Piping

Not used.

G304002 1.2 INSULATION

Not used.

G304002 1.3 EXPANSION

Not used.

G304002 1.4 SUPPORTS

Not used.

G304003 UNDERGROUND HOT WATER SYSTEMS

G304003 1.1 PIPING & FITTINGS

Direct buried, factory pre-fabricated, pre-insulated, piping systems must consist of a service pipe with polyurethane insulation and a high-density polyethylene (HDPE) jacket. Provide factory fabricated fittings and components. Field insulation of fittings is not allowed.

G304003 1.2 INSULATION

The minimum insulation thickness must be in accordance with the following tables:

Table 1 Insulation Thickness for Drainable/Dryable Systems

Nominal Pipe Diameterinches (mm)	Parocinches (mm)	Epitherminches (mm)	Kaylo-10 Thermo-12 Super Caltempinches (mm)
1.00 (25)	2.0 (51)	2.5 (64)	4.0 (100)
1.5 (38)	2.0 (51)	2.5 (64)	4.0 (100)
2.0 (51)	2.5 (64)	3.5 (90)	4.5 (115)
2.5 (64)	2.5 (64)	3.5 (90)	4.5 (115)
3.0 (76)	3.0 (76)	4.0 (100)	5.0 (125)
4.0 (100)	3.0 (76)	4.0 (100)	5.0 (125)
5.0 (125)	3.0 (76)	4.0 (100)	5.0 (125)
6.0 (150)	3.5 (90)	4.5 (115)	5.5 (140)
8.0 (200)	3.5 (90)	4.5 (115)	5.5 (140)
10.0 (250)	4.0 (100)	5.0 (125)	6.0 (150)
12.0 (300)	4.0 (100)	5.0 (125)	6.0 (150)
14.0 (350)	4.0 (100)	5.0 (125)	6.0 (150)
16.0 (400)	4.0 (100)	5.0 (125)	6.0 (150)
18.0 (450)	4.0 (100)	5.0 (125)	6.0 (150)

Table 2 Insulation Thickness for Water Spread Limiting Systems

Nominal Pipe Diameterinches (mm)	Calcium Silicateinches (mm)	Polyurethaneinches (mm)
1.00 (25)	N/A	N/A
1.5 (38)	N/A	N/A
2.0 (51)	N/A	N/A
2.5 (64)	N/A	N/A
3.0 (76)	1.00 (25)	1.23 (31)
4.0 (100)	1.00 (25)	1.23 (31)
5.0 (125)	N/A	N/A
6.0 (150)	1.5 (38)	1.34 (34)

8.0 (200)	2.0 (51)	1.21 (30)
10.0 (250)	2.5 (64)	1.31 (33)
12.0 (300)	2.0 (51)	1.29 (33)
14.0 (350)	N/A	N/A
16.0 (400)	N/A	N/A
18.0 (450)	N/A	N/A

G304003 1.3 UHDS DESIGN

Design and provide direct buried, factory-prefabricated, pre-insulated main hot water piping, including piping in manholes. Asbestos cement or plastic conduit is not acceptable. The Underground Heat Distribution System (UHDS) representative must be certified in writing by the UHDS manufacturer to be technically qualified and experienced in the installation of the system. Provide a Certificate of Satisfactory Operation certifying that at least 3 systems installed by the UHDS manufacturer within the previous 10 years have and are operating satisfactorily for not less than 5 years. The certificate must include verification information.

G304003 1.4 VALVING

Provide isolation valves on supply and return lines at take-offs for service to each building. Locate valves in valve boxes. Valves must be ASME class 150.

G304003 1.5 EXPANSION

Compensate for piping expansion by utilizing expansion loops.

G304004 UNDERGROUND STEAM DISTRIBUTION SYSTEMS

G304004 1.1 PIPING & FITTINGS

Not used.

G304004 1.2 INSULATION

Not used.

G304004 1.3 UHDS DESIGN

Not used.

G304004 1.4 VALVING

Not used.

G304004 1.5 EXPANSION

Not used.

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

Not used.

G305001 1.1.2 Steel Pipe Fittings

Not used.

G305001 1.1.3 Copper Fittings

Not used.

G305001 1.2 INSULATION

Not used.

G305001 1.3 SUPPORTS

Not used.

G305001 1.4 EXPANSION

Not used.

G305002 UNDERGROUND COOLING SYSTEMS

G305002 1.1 PIPING & FITTINGS

Not used.

G305002 1.2 VALVES

Not used.

G305090 OTHER COOLING DISTRIBUTION

G305090 1.1 EXPANSION

Not used.

G305090 1.2 WARNING & IDENTIFICATION TAPE

Not used.

G305090 1.3 CORROSION PROTECTION

Not used.

G3060 FUEL DISTRIBUTION

Not used.

G306001 LIQUID FUEL DISTRIBUTION PIPING

Not used.

G306001 1.1 MATERIALS

Not used.

G306003 LIQUID FUEL STORAGE TANKS

G306003 1.1 STORAGE TANKS

Not used.

G306003 1.2 FUEL PUMPS

Not used.

G306003 1.3 FUEL METERS

Not used.

G306004 LIQUID FUEL DISPENSING TANKS

Not used.

G306006 GAS DISTRIBUTION PIPING (NATURAL & PROPANE)

G306006 1.1 STEEL PIPE

Not used.

G306006 1.2 POLYETHYLENE (PE)

Not used.

G306007 GAS STORAGE TANKS

G306007 1.1 PROPANE STORAGE TANKS

Not used.

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 12/18

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 Unifomat 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 3-550-01	Exterior Electrical Power Distribution
UFC 3-570-02N	Electrical Engineering Cathodic Protection

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

UFGS 26 12 19.10	Three-Phase Pad-Mounted Transformers
UFGS 26 27 14.00 20	Electricity Metering
UFGS 26 56 00	Exterior Lighting
UFGS 33 71 02	Underground Electrical Distribution
UFGS 33 82 00	Telecommunications Outside Plant

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 1.3.6 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 12 19.10, *Three-Phase Pad-Mounted Transformers*

UFGS 26 13 00, *SF6/High-Firepoint Fluids Insulated Pad-Mounted Switch Gear*

UFGS 26 27 14.00 20, *Electricity Metering*

UFGS 26 56 00, *Exterior Lighting*

UFGS 33 71 02, *Underground Electrical Distribution*

UFGS 33 82 00, *Telecommunications Outside Plant*

G40 1.4.1 Sustainable Design Submittal

Not Used.

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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), must 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

Not Used.

G4010 ELECTRICAL DISTRIBUTION

G401001 SUBSTATIONS

Not Used.

G401002 TRANSFORMERS

When transformers are required, the Designer of Record must utilize UFGS Section 26 12 19.10, *Three-Phase 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

Not Used.

G401004 OVERHEAD ELECTRIC CONDUCTORS

Not Used.

G401005 TOWERS, POLES, CROSSARMS AND INSULATORS

Not Used.

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

Not Used.

G402003 OTHER AREA LIGHTING

Not Used.

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

Not Used.

G4030 SITE COMMUNICATION AND SECURITY

G403001 TELECOMMUNICATIONS SYSTEMS

Provide telecommunications backbone fiber optic cabling per UFC from base-wide telecommunications system.

G403002 CABLE TV SYSTEMS (CATV)

Not Used.

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

Not Used.

G403007 ELECTRONIC SECURITY SYSTEM (ESS)

Not Used.

G403008 OTHER COMMUNICATION AND ALARM

Not Used

G403009 GROUNDING SYSTEMS

Not Used.

G403010 INDUSTRIAL CONTROL SYSTEMS (ICS)

Not Used.

G4090 OTHER ELECTRICAL UTILITIES

Not Used.

-- End of Section --

SECTION H10

WATERFRONT STRUCTURES
12/18

H10 GENERAL

Not Used.

-- End of Section --

SECTION H20

GRAVING DRYDOCKS
12/18

H20 GENERAL

Not Used.

-- End of Section --

SECTION H30

COASTAL PROTECTION
12/18

H30 GENERAL

Not Used.

-- End of Section --

SECTION H40

NAVIGATION DREDGING AND RECLAMATION
12/18

H40 GENERAL

Not Used.

-- End of Section --

SECTION H50

WATERFRONT UTILITIES
12/18

H50 GENERAL

Not Used.

---End of Section---

SECTION H60

WATERFRONT DEMOLITION
12/18

H60 GENERAL

Not Used.

---End of Section---

SECTION H70

WATERFRONT ATFP
12/18

H70 GENERAL

Not Used.

---End of Section---

SECTION Z10

GENERAL PERFORMANCE TECHNICAL SPECIFICATION 12/18

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
http://www.wbdg.org/design/ensure_health.php

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

Not Used.

Z10 1.5 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTS

Verification of satisfactory construction and system performance must be via Performance Verification Testing, Acceptance Tests, and submittal of test reports certified by the Designer of Record (DOR), that work is in compliance with requirements of the RFP. The Government reserves the right to witness all Performance Verification and Acceptance Tests, review data, and request other such additional inspections and repeat tests as necessary to ensure that the work and provided services conform to the stated requirements. Contractor must pay the cost of all testing.

Refer to each PTS section to identify Performance Verification and Acceptance Testing required by the work specified in that PTS section.

Z10 1.6 SUBMITTALS

Contractor's design submittals that combines design and construction submittals, must jointly comply with Part 2 Sections 01 33 00.05 20, *Construction Submittal Procedures* and 01 33 10.05 20, *Design Submittal Procedures*. Contractor's construction submittals that are submitted separate from the design submittals must comply with Part 2 Section 01 33 00.05 20, *Construction Submittal Procedures*.

Refer to "Construction Quality Control" in Part 2 Sections 01 33 00.05 20, *Construction Submittal Procedures* and 01 45 00.05 20, *Design and Construction Quality Control* to define reviewing and approving Authority

of design and construction submittals.

Utilize the same materials and equipment that are approved and provided for an initial facility design, on all follow-on facilities that use the same design with-in this contract. Once the initial facility design is approved by the Government, the Contractor must obtain Government approval to change materials and equipment when designing and constructing follow-on facilities utilizing the same design.

Z10 1.6.1 DESIGN SUBMITTALS

Submit design submittals in accordance with Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, FC 1-300-09N, *Navy and Marine 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 FIVE

PRESCRIPTIVE SPECIFICATIONS

SECTION 11 50 10

PAINT SPRAY BOOTHS

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 CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)

ACGIH	Industrial Ventilation: A Manual of Recommended Practice (25th Edition)
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AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC Manual	Manual of Steel Construction, Thirteenth Edition
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AMERICAN IRON AND STEEL INSTITUTE (AISI)

AISI SG 02-1	North American Specification for the Design of Cold Formed Steel Structural Members
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ASTM INTERNATIONAL (ASTM)

ASTM A 123	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
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ASTM A 29/A 29M	Standard Specification for Steel Bars, Carbon and Alloy, Hot-Wrought General Requirements for
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ASTM A 36	Structural Steel
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ASTM A 1008	Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High Strength Low Alloy, High Strength Low Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
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ASTM A 1011	Standard Specification for Steel, Sheet and Strip, Hot Rolled, Carbon, Structural, High Strength Low Alloy, High Strength Low Alloy with Improved Formability, and Ultra High Strength
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ASTM A 653	Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A 755	Steel Sheet, Metallic-Coated by the Hot- Dip Process by the Coil Coating Process for Exterior Exposed Building Products
ASTM A 792	Steel Sheet 55 Percent Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
ASTM B 103	Standard Specification for Phosphor Bronze Plate, Sheet, Strip, and Rolled Bar
ASTM C 920	Elastomeric Joint Sealants

ENGINEERING TECHNICAL LETTERS (ETL)

ETL 02-15	Fire Protection Engineering Criteria - New Aircraft Facilities
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NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA ICS 1	Industrial Control and Systems: General Requirements
NEMA ICS 2	Industrial Control and Systems Controllers, Contactors, and Overload Relays Rated 600 volts
NEMA ICS 6	Industrial Controls and Systems Enclosures

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 1	Fire Code
NFPA 13	Errata 10-1; TIA 10-1; TIA 11-2) Standard for the Installation of Sprinkler Systems
NFPA 33	Standard for Spray Application Using Flammable or Combustible Materials
NFPA 70	National Electrical Code (NEC)
NFPA 90A	Errata 09-1) Standard for the Installation of Air Conditioning and Ventilating Systems
NFPA 91	Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids
NFPA 101	Life Safety Code

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 519 Guide for Harmonic Control and Reactive
 Compensation of Static Power Converters
 Pertaining to Motor Controllers

INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS (ICBO)

IBC International Building Code

IMC International Mechanical Code

IPC International Plumbing Code

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 3-260-01 Airfield and Heliport Planning and Design

UFC 3-600-01 Fire Protection Engineering for Facilities

UFC 3-410-04N Industrial Ventilation

Code of Federal Regulations

40 CFR Part 63 Subpart GG National Emission Standards for Hazardous Air
Pollutants (NESHAP)

1.2 GENERAL REQUIREMENTS

1.2.1 Related Requirements

Provide the final utility connections and utility service to the equipment in accordance with Division 1 specifications; Section 26 00 00.00 20 BASIC ELECTRICAL MATERIALS AND METHODS; and Section 26 20 00 ELECTRICAL WORK, INTERIOR DISTRIBUTION SYSTEM.

1.2.2 Requirements

Provide the design, furnishing, roughing-in, electrical work, installation of equipment, testing and final connection of utilities, with labor, services, and incidentals necessary for complete and fully operational cross-draft paint booth equipment installation. Booth, doors, mechanical equipment, pitter walls, exhaust chambers, exhaust structures, and stacks shall be self-supporting and not rely on the building structure for vertical or horizontal support or stability without coordination and approval of the structural designer of the building structure. Provide piping, wiring, and switching between equipment and single-point utility connections. The design, equipment, and installation shall be in accordance with, Unified Facilities Criteria, Engineering Technical Letters, NFPA 1, NFPA 16, NFPA 33, NFPA 54, NFPA 70, NFPA 90A, NFPA 91, NFPA 101, NFPA 409, IBC 2009, IMC 2012, IPC 2012, IFC 2012, and ACGIH standards.

1.3 QUALITY ASSURANCE

1.3.1 Experience

Paint Booth Contractor and equipment shall be produced by a manufacturer of established reputation with a minimum of 5 years' experience supplying

specified equipment.

1.3.2 Manufacturer's Representative

- a. Installation: Provide a qualified manufacturer's representative on-site to supervise work related to equipment installation, check-out and start-up.
- b. Training: Provide technical representative to train Owner's maintenance personnel on-site in operation and maintenance of specified equipment.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings; G

Submit Shop Drawings in accordance with Division 1 - General Requirements of these specifications. Shop Drawings shall include all structural, mechanical, electrical and any other calculations as required to review and approve the work.

Submit a 3D AutoCad drawing file or Revit drawing file on a CD of the paint booth insert and equipment. This will be used to verify adequate clearances with existing structure and for conflict resolution.

SD-03 Product Data

Products; G

Submit Product Data in accordance with Division 1 - General Requirements of these specifications. Restrict submitted material to pertinent data. For instance, do not include manufacturer's complete catalog when pertinent information is contained on a single page.

SD-05 Design Data

Submit sealed structural design.

Submit design of mechanical systems for booth and door.

Submit design of electrical systems for booth and door.

Submit design of integral fall arrest system for booth.

Submit foundation forces and anchorage requirements (anchor types, sizes, locations and layouts) 90 days prior to start of foundation construction.

Registered professional engineers shall prepare and seal the design calculations, specifications, and drawings.

SD-06 Test Reports

Submit test reports indicating compliance with the performances listed in paragraph entitled "Performance Requirements."

SD-07 Certificates

Include written certification that the test data were taken on sample components identical to the material supplied under this specification.

SD-10 Operation and Maintenance Data

Equipment; G

Provide complete parts, operating and maintenance manual covering equipment at time of installation including, but not limited to:

Description of system and components.

Electrical single-line power diagram, including motor horsepowers.

Schematic diagrams of electrical (clearly indicating field wiring, wire type, wire size, wire insulation color code, and wire number), plumbing, compressed air, and chilled water systems.

Manufacturer's printed operating instructions.

Printed listing of periodic preventive maintenance items and recommended frequency required to validate warranties. Failure to provide maintenance information will indicate that preventive maintenance is not a condition for validation of warranties.

List of original manufacturer's parts, including suppliers' part numbers, catalog cuts, recommended spare parts stockage quantity and local parts and service source.

Submit in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA.

1.5 WARRANTY

Warrant work specified herein for one year from substantial completion against defects in materials, function and workmanship.

Warranty shall include materials and labor necessary to correct defects.

Defects shall include, but not be limited to noisy, rough or substandard operation; loose, damaged, and missing parts; and abnormal deterioration of finish.

Submit warranties in accordance with Division 1 - General Requirements of these specifications.

All parts shall be readily available locally in the United States.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

Deliver equipment in manufacturer's containers, appropriately packaged and/or crated for protection during domestic shipment and storage in humid, dusty conditions.

Indelibly label all containers, including those contained in others, on outside with item description(s) per title and Mark Number of this specification.

Provide equipment and materials specified complete in one shipment for each equipment item. Split or partial shipments are not permissible.

1.7 LABELING

Manufacturer shall securely attach in a prominent location on each major item of equipment a noncorrosive nameplate showing manufacturer's name, address, model number, serial number, and pertinent utility or operating data.

Labeling for mechanical equipment, ductwork, piping, and valves shall be in accordance with Section 23 03 00.00 20 BASIC MECHANICAL MATERIALS AND METHODS

All electrical equipment and materials shall be new and shall be listed by Underwriters Laboratories Inc. (UL) in categories for which standards have been set by that agency and labeled as such in the manufacturer's plant. Control panel shall be UL-labeled.

1.8 COORDINATIONS

Paint Booth Contractor shall coordinate the work with the Base Engineers in the designing and installation of the paint booth.

1.9 PERMITS

Paint Booth Contractor shall coordinate with the Contracting Officer, Base Environmental Office, and obtain construction and operation permits in accordance with Section 00 70 00, Contract Clauses.

1.10 DESIGN PARAMETERS

The Paint Booth insert shall be of prefabricated construction (steel) and will resist all gravity and lateral loads. Paint Booth shall be of free standing construction, and anchored to the floor slab.

The Paint Booth shall be designed to support all collateral equipment. Booth and mechanical equipment shall be self-supporting and not rely on the building structure for vertical or lateral support or stability without coordination and approval of the structural designer of the building structure. All structural components shall be designed within the allowable working stress of the materials as established in the AISC Manual "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings", and the AISI SG 02-1.

1.10.1 Design Live Loads

The mechanical and structural components of the booth and doors shall be designed to accommodate the following live loads and operating conditions, including temperature differentials in addition to the dead load:

- a. Doors in Open or Closed Position: The design live load conditions for the doors in the closed position under static load shall be either 1., or 2., whichever is greater, as follows:

1. Door shall be designed for wind pressures based on a minimum design wind speed given in this RFP or calculated IAW ASCE-7 (including components and cladding), with not more than 2 inches of deflection.

2. Seismic criteria per requirements in this RFP as calculated IAW the International Building Code, (IBC).

- b. Paint Booth ceiling/roof structure uniform live load shall be 40 psf minimum, and a 300 lb concentrated load.
- c. Stairs, landings, handrails, and guardrails for the paint booth shall be included and designed IAW IBC.

1.10.2 Booth Support Base Forces

Forces transmitted to foundations shall be vertical (tension or compression) and horizontal shear forces. Moments shall not be transferred to the foundations. Design support base details to interface with foundations of building structure.

1.10.3 Maintenance Access Items

Equipment mounted above booth ceiling and other equipment on elevated structures shall have access platforms, access ladders, protective guard rails, steps, and lights necessary for maintenance activities. Live loads shall include appropriate loads IAW ASCE-7.

1.10.4 Seismic and AT/FP Bracing of Equipment

Mechanical, electrical and architectural items shall have seismic bracing IAW IBC, ASCE-7, and UFC 4-010-01.

PART 2 PRODUCTS

2.1 PAINT BOOTH

The Paint Booth Contractor shall be responsible for all coordination.

2.1.1 Capacities and Dimensions

- a. Interior Clear Dimensions: Width: 12 ft. Length: 26 ft.
- b. Interior Clear Height: 12 ft.
- c. Personnel Doors: Quantity: 2.
- d. Paint Booth Doors: Quantity: 2. Size and construction as indicated.
- e. Fire Sprinklers: Coordinate with fire protection Contractor. See Section 21 13 13.00 10 WET PIPE SPRINKLER, FIRE PROTECTION. Fire protection systems shall be provided in accordance with UFC 3-600-01.
- f. Compressed Air: Coordinate with plumbing contractor. See Section 22 15 14.00 40 GENERAL SERVICE COMPRESSED-AIR SYSTEMS, LOW PRESSURE.

2.2 MATERIALS AND CONSTRUCTION

2.2.1 Construction

Paint booth shall be constructed of minimum 18-gauge electro-galvanized steel panels supported by structural I-beams at regular intervals for rigidity and integrity of booth structure. Interior surface of paint booth shall be color white, powder-coated, bake-on type finish. Exterior of booth shall be per 2.4.1.5.

2.2.2 Mounting

Booth shall be mounted directly to the floor of the Paint Room with the use of stainless steel brackets. See Section C/S 302. Anchorage shall be provided by the booth supplier.

2.2.3 Paint Booth Personnel Doors

Include hollow metal doors (and frames) with observation window. Provide for effective sealing of opening.

2.2.4 Utility Stations

Booth shall provide interior quick disconnects for shop air as required from building supply sources. Utility stations shall be located on the side walls of booth.

2.2.5 Lighting

Lighting fixtures shall be four tube, NFPA and OSHA code approved fixtures with clear tempered glass windows that accept four 4-foot T5HO fluorescent, natural light, 5,000 K color balanced tubes (90 CRI) ceiling recessed, with fused, high-power factor, low-harmonic, ballasts. Cool-white or warm-white fluorescent tubes are not acceptable. A minimum of 100 average, maintained, horizontal foot candles measured 30 inches above the floor shall be provided to all work areas within the booth (with only the ceiling recessed light fixtures "on"). Provide 90-minute battery powered inverter ballasts on normal light fixtures to provide emergency lighting as required. Provide 90-minute battery powered red LED illuminated emergency exit sign above each personnel door inside of the booth. All wiring and devices shall be rated explosion-proof and listed for Class 1, Division 1 locations. All recessed, gasketed light fixtures shall be rated Class I Division 2 Group D. Light fixture maintenance shall be totally accessible from inside the booth. Light fixture hinged doors shall be interlocked with painting air to prevent painting air from operating when any light fixture door is open.

2.2.6 Hazard Classification

Spray booth interior shall be rated as a Class 1, Division 1, Group D hazardous location from floor-to-ceiling, wall-to-wall, and within 3 feet of all door openings (see Plans). All electrical installations shall comply with NEC.

2.2.7 Door Seals

Coordinate the design of the door seal system with the building architectural and structural details, and the mechanical ventilation system. Use fully adjustable door seal system to permit initial setting during installation of the doors and to permit future adjustments. Use door sealing system designed for ease of replacement and that incorporates commercially available components.

2.3 PAINT BOOTH MECHANICAL SYSTEMS

2.3.1 Indoor and Outdoor Design Conditions

a. Outdoor Conditions:

Design Conditions (UFC 3-400-02)

(1) Location: Naval Station Norfolk - Weather Station 723085

(2) Latitude: 36.93° North

(3) Longitude: 76.28° West

(4) Elevation: 16 feet

(5) Climate Zone: 4A

(6) Design Temperatures:

- (a) Outside Design (cooling 0.4%): 94.1°F db/77.2°F MCWB
- (b) Outside Design (heating 99.6 %): 23.8°F db
- (c) Outside Design for OAHU (humidity ratio 0.4%): 142.5
gr/lb/84.1°F MCDB, 77.4°F DP

b. Indoor Conditions:

1. Paint Booth (Paint Mode): 65-75 degrees F DB and 45-60 percent RH at 75 fpm cross sectional velocity, with an 80/20 recirculation to outside air flow rate.
2. Paint Booth (Standby Mode):
 - a) Ventilation Only: 60 degrees F DB minimum with no humidity control, at 15 fpm cross sectional velocity, at 100 percent outside air.
 - b) Temperature and Humidity Control: 75 degrees F DB plus or minus 5 degrees F and 50 percent RH plus or minus 5 percent RH, at 15 fpm cross sectional velocity, at 100 percent outside air.
3. Paint Booth (Cure/Dry Mode):
 - a) 75 degrees F DB plus or minus 5 degrees F and 50 percent RH plus or minus 5 percent RH, at 50 fpm cross sectional velocity, with an 80/20 recirculation to outside air flow rate.

2.3.2 Air Flow System

The airflow system shall serve all modes of operation for the paint booth and must be able to operate at a uniform cross sectional velocity across the entire length of the booth ranging from 75 fpm down to 15 fpm while maintaining the space conditions indicated. Negative pressure inside the booth shall be maintained at all times.

100 percent of the air from the paint booth will pass through a 3-stage NESHAP compliant filter system. 20 percent of the air will be exhausted to the atmosphere, and 80 percent will be re-circulated to the supply plenum of the paint booth. An air handling unit supplying 100 percent outside air will supply 20 percent of the total airflow to the paint booth.

The paint booth system shall have the following modes of operation: Paint Mode; Standby Mode; Cure/Dry Mode; Purge Mode; and Off Mode.

The Paint shall be designed for 75 fpm velocity in the booth to remove overspray. This mode will maintain the design conditions indicated above.

The Standby Mode shall be designed for 100 percent outside air at 15 fpm velocity in the paint booth. In the Standby Mode, the system can be in a Ventilation Only Mode or a Temperature and Humidity Control Mode. In the Ventilation Only Mode, the temperature shall be maintained as indicated above with no humidity control. In the Temperature and Humidity Control Mode, the temperature and humidity shall be maintained as indicated above. The recirculation fans shall not operate during this mode of operation.

The Cure/Dry Mode shall be designed at a reduced velocity of 50 fpm in the paint booth after painting. The temperature and humidity shall be maintained as indicated above.

The Purge Mode shall be designed for 100 percent outside air at 15 fpm velocity in the paint booth. Sensors located in the exhaust plenum shall be used to detect if the air is above 25 percent of the lower explosive limit. If 25 percent of this limit is exceeded, the paint booth shall go into the "Purge Mode" where the recirculation fans shall be off, and the air handling unit shall supply 15 fpm air velocity of outside air through the booth, all of which shall be exhausted. Alarms shall sound and the occupants shall evacuate the booth until the conditions return to normal. The temperature will be maintained as if in the Ventilation Only Mode of the Standby Mode during the Purge Mode.

The Off Mode shall be designed for all fans to be turned off. This mode shall be used during periods of complete booth inactivity and maintenance.

2.3.3 Heating, Ventilating, and Air Conditioning

The paint booth shall be ventilated and air conditioned by means of an air handling unit consisting of a filter section, a wrap-around heat pipe that surrounds a chilled water coil section, an electric reheat section, a supply fan section with a variable frequency drive. Automated Heat Lamps shall be provided to heat the paint booth. The air handling unit shall condition 100 percent outside air and will mix with the recirculation air prior to the supply air plenum. Recirculation air fans shall be variable speed drive and shall be inline type fans. Duct mounted smoke detectors, controls and ductwork for the air handling units and recirculation fans shall be provided with each paint booth. The air handling units and recirculation fans shall be supported from the paint booth structure and will need to be coordinated with the structure of the building. The air handling units and recirculation fans shall be installed in a manner that allows them to be accessible for routine maintenance and replacement. All electrical motors, starters, wiring, conduit, boxes, and associated equipment shall be rated for Class 1, Division 1 locations if installed in such an area. Ductwork and duct accessories shall be in accordance with Section 23 00 00 AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEM.

2.3.4 Chilled and Heating Hot Water Systems

Chilled and heating hot water will be available for the paint booth HVAC system. Chilled water piping and chilled water pipe insulation shall be in accordance with Sections 23 64 26 CHILLED AND CONDENSER WATER PIPING SYSTEMS and Section 23 07 00 THERMAL INSULATION FOR MECHANICAL SYSTEMS. Cooling and heating coil loads and flow requirements will need to be provided to the AE for coordination. Cooling coil is to be sized based on 44 degrees F entering water temperature and 56 degree F leaving water temperature.

2.3.5 Paint Booth Controls

The controls for the paint booth system shall be direct digital and comply

with ASHRAE Standard 135, BACnet. All booth functions shall be controlled and monitored from a single, standalone control panel located as indicated. The booth controls system shall be capable of recording and trending data for temperatures, air flows, (VFD frequency), and booth mode for a period of 8 hours. Provide momentary red mushroom head (push to stop and pull to reset) HVAC emergency shutdown switch within the paint booth with clear, hinged cover.

2.3.6 Exhaust Filtration System

The exhaust filtration system shall be based on the Best Available Control Technology (BACT) or the Lowest Available Emission Rate (LAER) and approved by the AE.

MSDS List of paint and other materials used in the paint booth shall be available upon request through the Contracting Officer.

2.3.6.1 3-Stage NESHAP Compliant Paint Booth Filtration System

Exhaust filtration system shall include factory-fabricated, NESHAP compliant 3-stage filter system, replaceable air filters with holding frames. System shall be in accordance with 40 CFR, Part 63, Sub-part GG - National Emission Standards for Hazardous Air Pollutants (NESHAP) for Aerospace Manufacturing and Rework Facilities. The filter system shall be 3-stage that meets Subpart GG requirements for a new booth and has a minimum particulate capture efficiency of 95 percent. Air filters shall be replaceable with holding frames Stage 1 filter shall be 1-inch thick polyester flat filter panel with paint holding capacity of 2.7 pounds of paint per square foot of filter. Stage 2 filter shall be 1-1/2 inch thick multi-layered tackified polyester media. Stage 3 filter shall be 12-inch thick, five pocket, angled filter. Filters shall be front loading for front access from inside the paint booth. Permanently gasket framing members shall prevent bypass of unfiltered air. Provide a magnahelic differential pressure gauge across each filter stage. Filter differential pressure, dp, shall be monitored by the Booth Control system, and alarm when dp indicates fouled filter media.

2.3.6.2 Exhaust Fans and Stacks

Exhaust fans shall be variable speed drive and designed to maintain booth under negative pressure. Stacks shall be designed to match appearance of existing stacks, or provide induced draft (Strobic) type exhaust fans and stacks. Total stack height shall not penetrate the airspace imaginary surfaces per UFC 3-260-01. Exhaust fans shall be installed in a manner that allows them to be accessible for routine maintenance and replacement. Exhaust stacks and exhaust equipment shall be self-supporting and not rely on the building structure for vertical or lateral support without coordination and prior approval of the structural designer of the building structure.

2.3.7 Compressed Air

Compressed air shall be provided in the paint booth. Four compressed air drops on each side of the paint booth shall be provided. Coordinate with the Design/Build contractor for the POC for the compressed air piping. Compressed air piping shall be in accordance with Section 22 15 14.00 40 GENERAL SERVICE COMPRESSED-AIR SYSTEMS, LOW PRESSURE.

2.3.8 Heat Pipe Heat Exchangers

Install heat pipe heat exchangers around the chilled water coils of the air handling unit to pre-cool the entering air to the chilled water coil and then re-heat the discharge air from the chilled water coil.

2.3.9 Supply and Exhaust Air

Supply and exhaust air shall be equipped with variable frequency drives. Motors driven by variable frequency drives shall be "inverter duty" with 1.15 SF. All safety disconnects shall be fused and shall be provided by the Paint Booth Contractor.

2.3.10 Equipment and Materials Selection

The applicable specification sections specified herein shall be used for selecting equipment and materials.

2.4 PAINT BOOTH DOORS

The paint booth doors shall be designed by the manufacturer in accordance with the criteria specified herein. Doors shall operate properly without binding, interface, or damage to weather stripping. Doors shall fit closely and be free from warping. Door size shall be as indicated and shall be closely coordinated with all other work to assure proper fit and weather tight closure with the building structure. Door shall, as a minimum, meet the following performance criteria:

- a. Be of two leaf outswing design capable of rotating 90 degrees to full open position. Door size shall not exceed the clearance envelope as indicated, shall operate within the clearance provided by the facility doors, and shall, when open, not project within the paint booth clearance.
- b. Be hinged or otherwise connected to the paint booth. Doors shall be self-supporting or supported off the paint booth. All door support structure by paint booth contractor.
- c. Door leaves shall have positive restraints in both open and closed position.
- d. Paint booth door support system, including steel columns, beams, bracing and connections to concrete floor slab, shall be by Paint Booth Contractor.

2.4.1 Materials

2.4.1.1 Structural Steel

Structural Steel shall be IAW International Building Code and all applicable design and ASTM references.

2.4.1.2 Formed Steel

AISI SG-971-Spec

2.4.1.3 Sheet Steel

ASTM A 1011, hot-rolled sheet steel, commercial quality, or ASTM A

1008, cold-rolled steel sheet, commercial quality.

2.4.1.4 Galvanized Steel

ASTM A 653, coating designation G90 galvanized steel sheet, commercial quality.

2.4.1.5 Exterior Wall Panels

Panels shall be steel and shall have a mill finish. Wall panels shall be fastened to framework using exposed fasteners. Length of panels shall be sufficient to cover the entire height of any unbroken wall surface when length of run is 30 feet or less. When length of run exceeds 30 feet, each sheet in the run shall extend over two or more spans. Sheets longer than 30 feet may be furnished if approved by the Contracting Officer. Panels shall be formed without warping, waviness, or ripples that are not a part of the panel profile and shall be free of damage to the finish coating system. Approval of panel profile required.

Steel panels shall be zinc-coated steel conforming to ASTM A 653, Structural Grade 40 and minimum G90 galvanized smooth metallic coating; aluminum-zinc alloy coated steel conforming to ASTM A 792, AZ 55 coating. Pre-painted steel sheet shall also comply with ASTM A 755. Wall panel material shall be minimum 24 gage thick prior to coating application, and as required to meet wind load requirements. Panels shall be within 95 percent of the nominal thickness. Prior to shipment, mill finish panels shall be treated with a passivating chemical and oiled to inhibit the formation of oxide corrosion products. Panels that have become wet during shipment and have started to oxidize shall be rejected.

Install exterior covering and insulation on the assembled door structure in accordance with the siding manufacturer's recommendation and approved Shop Drawings. Form and seal joints so that both sides of the covering are weather tight and the plenum is airtight.

2.4.1.6 Interior Wall of Paint Booth Doors

The interior wall of paint booth doors shall match exterior flat liner wall panels.

2.4.1.7 Insulation

Permanently secure insulation materials in place between the exterior wall panel and liner panels. Insulation "R" value not less than R-19, a flame spread rating of 75 or less and a smoke-developed rating of 100 or less when tested in accordance with ASTM E 84. Do not use cellular plastics.

2.4.1.8 Accessories

Sheet metal flashings, trim molding, closure strips, caps, sub-girts and other similar sheet metal accessories used in conjunction with the preformed panels shall be of the same material and finish as the panels, except that such items which will be concealed after installation may be provided unfinished if they are zinc-coated steel. Metal shall be of a thickness not less than that used for the panels.

2.4.2 Hardware

Provide hardware suitable for use on paint booth doors and designed to accommodate actual dead loads plus wind loads specified herein.

2.4.3 Weather-stripping

Rubber bulb seals shall be resistant to incidental contact with the chemicals and solvents used in the facility. MSDS list of paint and other materials used in the paint booth shall be available upon request through the Contracting Officer.

2.4.4 Fasteners

Either zinc-coated or cadmium-plated steel.

2.4.5 Sealant

Single-component or multi-component elastomeric type conforming to ASTM C 920, Type S or M, Grade NS, Class 12.5, Use NT. Provide a sealant that has been tested on the type(s) of substrate to which it will be applied.

2.4.6 Paint for Prime Coat

Zinc-molybdate, (ZnMoO₄), type, FS TT-P-645, alkyd type.

2.5 PAINT BOOTH ELECTRICAL EQUIPMENT AND SYSTEMS

Provide a single-point electrical panelboard (as indicated on plans) for the paint booth. Coordinate with the Project Electrical Engineer for electrical requirements. Provide all necessary conduit, boxes, wire, receptacles, switches, panel boards, transformers, motor control centers, power distribution, associated connections, conduit, wiring, fused paint booth lighting, HVAC, and appurtenances to make for a functional installation.

All electrical equipment shall be per Division 26 specification sections and shall comply with the NEC for the area in which it is installed. Paint booth installer shall coordinate all electrical installations with other electrical subcontractors on the jobsite. Route all exposed conduit in the building that is attached to the building walls above 8 feet-0 inches above the floor. Provide each paint booth insert with the following:

- a. Provide UL-labeled control panel with integral door interlocked fused main electrical disconnect. Panel shall have a single-point electrical service and shall include all wiring, conduit, grounding, fuses, switches, required motor controllers, power distribution, fused control transformers, and control devices to serve all paint spray booth related equipment including spray booth ventilation and air-conditioning. Panel enclosure shall be weatherproof with NEMA 4 enclosure.
- b. Provide complete single point connection operator's control panel for HVAC system, lights and all other equipment located as indicated.
- c. Interlock paint spray nozzles with both ventilation system and light fixture lens door limit switches.
- d. Provide 12-pulse variable frequency drives (VFDs) which shall have 2 percent in-line reactors and harmonic mitigation to comply with IEEE 519 Tables 10.1 and 10.3.
- e. Control panel shall be located outside of the hazardous envelope. See plans for location.
- f. Provide HVAC system red maintained (push to stop and pull to reset)

mushroom head push-button emergency shutdown with clear plastic hinged cover.

- g. Provide flashing back illuminated sign reading "Do Not Enter - Painting in Progress" over each personnel door that is "ON" when in the painting mode.
- h. Provide 6 hard-wired, surface mounted, explosion-proof 20A, 120 volts AC, 2P, 3W, duplex receptacles (3 on the north wall and 3 on the south wall) in each paint booth. Provide one dedicated circuit for each receptacle and one mating plug for each receptacle. Route conduit on the outside of the paint spray booth. Furnish two mating, explosion-proof 20A plugs for each explosion-proof receptacle.
- i. One explosion-proof public address (PA) speaker (70.7 V) (coordinate with PA system).
- j. Provide explosion-proof Mass Notification System (MNS) speakers (70.7 V) (coordinate with MNS).
- k. Provide explosion-proof Mass Notification System amber strobes (24 volts DC) (coordinate with MNS).
- l. Provide explosion-proof Fire Alarm white strobes (24 volts DC) (coordinate with Fire Alarm).
- m. One ground bus with wall mounted stand-off insulators.

PART 3 EXECUTION

3.1 INSPECTION

Coordinate location of rough-in work and utility stub-outs to assure match with equipment to be installed. Inspect delivered equipment for damage from shipping and exposure to weather. Compare delivered equipment with packing lists and specifications to assure receipt of all items.

3.2 INSTALLATION

Perform work under direct supervision of Foreman or Construction Superintendent with authority to coordinate installation of scheduled equipment with Contracting Officer. Install equipment in accordance with plans, Shop Drawings, and manufacturer's instructions:

- a. Positioning: Place equipment in accordance with any noted special positioning requirements generally level, plumb and at right angles to adjacent work. Inside clear booth dimensions shall extend out to both entry and exit approaches to the booth to prevent interference with materials entering and leaving.
- b. Fitting: Where field cutting or trimming is necessary, perform in a neat, accurate, professional manner without damaging equipment or adjacent work.
- c. Anchorage: Attach equipment securely to floor to prevent damage resulting from inadequate fastening. Installation fasteners shall be installed to avoid scratching or damaging adjacent surfaces.
- d. Upon completion of work, finish surfaces shall be free of tool marks, scratches, blemishes, and stains.
- e. All electrical work shall comply with the NEC and NFPA.

- f. All metal parts of the paint booth shall be effectively grounded by metal to metal contact.

3.3 TESTING

After final connections are made and prior to authorizing payment, equipment shall be tested for compliance with all specified features in the presence of the Contracting Officer using acceptance procedures provided by the manufacturer. Conduct a 8-day endurance test on all mechanical systems.

3.3.1 Performance Testing

Paint Booth Contractor shall submit statements signed by responsible representatives of the manufacturer attesting to conformance to the specified requirements. The statements shall be dated after on-site performance testing has been completed, and shall list the specific requirements which are being certified.

3.4 CLEANUP

- a. Touch-up damage to painted finishes.
- b. Wipe and clean equipment of any oil, grease, and solvents, and make ready for use.
- c. Clean area around equipment installation and remove packing or installation debris from job site.
- d. Notify Contracting Officer for acceptance inspection.

3.5 TRAINING

Direct the technical representative to provide 16 hours of on-site training to designated Owner's maintenance personnel in operation and maintenance of all Paint Booth related equipment. Coordinate, with Owner, training schedule and list of personnel to be trained. Document and submit the training log of curriculum and attendees to the Contracting Officer or designated alternate.

- a. Paint Spray Booth: 16 hours.

Obtain, from technical representative, a list of Owner's personnel trained in equipment operations and maintenance.

3.6 GROUNDING

Provide grounding of paint booth metallic structure per NEC. Coordinate with other electrical contractors on the jobsite.

3.7 FIELD QUALITY CONTROL

3.7.1 Inspection

Examine each item for visual defects, and correct all defects to conform to the specifications.

-- End of Section --

PART SIX – ATTACHMENTS

- **All Attachments listed will be provided in Electronic Format. No hardcopies are provided in this RFP.**

DRAWINGS

- AIMD Consolidation – As-Builts – 2005 – (PDF - 634 Sheets).
- Composite Shop Concept – DWG1 & 2 (2 PDF – 1 Sheet Each).
- Site Location Map (PDF – 1 Sheet).
- Existing Conditions Plan (PDF – 1 Sheet).
- Concept Site Plan (PDF – 1 Sheet).
- Concept Grading and Drainage Plan (PDF – 1 Sheet)
- Aircraft Wash Area (TIF – 1 Sheet).
- Drainage Corrections for Aircraft Wash Slab 1964 (TIF – 1 Sheet).

EQUIPMENT

- Clayton - Specs (PDF – 2 Pages).
- Downtron – Brochure (PDF – 2 Pages).
- Downtron – DWG (PDF – 1 Page).
- PAPCE – Specs (PDF – 20 Pages).
- TigerVac – Specs (PDF – 5 Pages).
- 1702359 – FFE Preliminary Cost Summary (PDF – 2 Pages)

FORMS

- Permits Record of Decision (PROD) Form – (Word – 12 Pages).
- Performance Assessment Plan (PAP) Monthly Report – (Word – 3 Pages).
- Utilities Connection Report and Instructions (PDF – 13 Pages).
- BVD Guidelines – 3K – 150K – (Word – 2 Pages).
- BVD Guidelines – Greater than 150K – (Word – 2 Pages).
- NAVFAC LID Data Card – (PDF – 1 Page).
- NAVFAC LID Waiver Form – (Word – 3 Pages).
- Performance Rating Method Compliance Form – (PDF – 3 Pages).
- Procurement Sheet 1 and 2 – (2 Excel – 1 Page Each).
- Management of Excavated and Imported Soils SOP (PDF – 35 Pages).
- Tree Preservation and Replacement Instruction (PDF – 15 Pages).

REPORTS

- Final Geotechnical Report – MILCON P280 (PDF – 70 Pages).
- Hydrant Flow Test – NSN – SP-302 (PDF – 1 Page)

