VOLUME 1 OF 3

MATOC TASK ORDER
(SOUTH FLORIDA HUBZONE)

RFP NO: W9127818SFHZ0003
CADD CODE: MEY18005

SPECIFICATIONS

FOR

ENGINEER RESEARCH AND DEVELOPMENT CENTER (ERDC)
SECURE COMPUTING FACILITY

VICKSBURG, MISSISSIPPI

(WARREN COUNTY)

“GOOD ENGINEERING RESULTS IN A BETTER ENVIRONMENT”

U.S. ARMY ENGINEER DISTRICT, MOBILE
109 St. Joseph St
Mobile, Alabama 36602
TO: SOUTH FLORIDA HUBZONE OFFERORS

Subject: W9127818SFHZ0003, Task Order, Request for Proposal (RFP) Secure Computing Facility, ERDC, Vicksburg, MS.

1. You are requested to submit a Firm Fixed-Priced (FFP) proposal, as detailed in the specifications, on the website that will be provided to you by e-mail from the Contract Specialist.

Description of Work: The project is to construct the Secure Computing Facility at Engineering Research and Development Center (ERDC), in Vicksburg, MS. The new facility will be a 13,470 SF of a single story structure with Insulated Precast Wall Panel as exterior wall back-up with Brick Veneer & Stucco. The building structure shall consist of light gauge metal trusses with standing seam metal roofing. The scope of work includes exterior, roofing, building interior, finishes, casework, plumbing, HVAC, lighting, electrical systems, and sitework. Construction phasing is required.

The approximate Cost Range for the project is estimated to be between $1,000,000.00 - $5,000,000.00

Basis of Award: Low Price

Construction Time: 540 Days

Liquidated Damages: Please refer to Specification Section 01 00 00

Wage Rates – Please refer to Specification Section 01 00 00

2. You are requested to submit your proposal not later than 2:00 pm (CST), September 4, 2018 electronically to the following email address:

   SAMCT-C@usace.army.mil

Proposals shall be emailed in .pdf format, hard copies are not required to be submitted.

It is requested that all technical questions be submitted to the Bidder’s Inquiry Portal in Projnet at website http://www.projnet.org/projnet, in order to be considered for response and inclusion in the amendment. The cut-off date for submission of RFIs is August 20, 2018. Do not send RFI’s after this date. All RFIs for this solicitation will be posted in the Projnet website for your review. Please see Requests for Information attached.

3. If a Contractor does not wish to be considered for this particular task order, please respond in writing on or before the proposal due date indicating the reasons why.
4. Your proposal should include a cover letter (on company letterhead) documenting the submission of your proposal to include a signature by an officer of the company so duly authorized to bind the company contractually. Amendments shall be acknowledged by completion of blocks 15A and 15B, and 15C of Standard Form 30 Amendment form and returned with your proposal.

5. Price Proposal should include the following:

   a. The contractor shall provide a FFP proposal for performance of this project as identified in the Scope of Work.

   b. The FFP shall be structured as described in the solicitation, and shall match the format of the RFP Bidding Schedule.

   c. In accordance with Section 1004, paragraph 4.3.2.3 of the main IDIQ contract document, the prices for the CLINs, as offered in the original solicitation CLIN schedule, shall serve as the basis for establishing prices for all contract CLINS utilized in pricing this task order (and all modifications thereto), including the field overhead, design, and mark-ups, as applicable to the work involved in the requirement.

The Contractor's costs for the CLINs may be equal to or less than, but shall not exceed the costs shown in the contract CLIN schedule. The Government reserves the right to obtain breakdowns of the proposals, in the event discussions of prices are required in order to resolve differences between the proposals and the Government’s estimate. Such price discussions, normally, will be conducted with all Contractors that are competing on the same Task Order. However, a Contractor may be excluded from discussions, in the interest of efficiency and timeliness of the award of a Task Order, if their price is so unreasonable that it will have little or no chance of becoming competitive."

The Government reserves the right to verify Contractor past performance information which may include reference checks and reviews of surveys found in the Past Performance Information Retrieval System (PPIRS). The Government reserves the right to verify past and present performance on any projects performed by the Offeror. The Offeror will be given an opportunity to address adverse past performance information, if the Offeror has not had a previous opportunity to review the rating. Recent contracts with interim ratings that are below “Satisfactory” will be examined to ensure that corrective measures are being implemented. The Contracting Officer will consider the number and severity of the problems, the appropriateness and/or effectiveness of any corrective actions taken (not just planned or promised), and the Offeror's overall work record. Prompt corrective action in isolated instances may not outweigh overall negative trends.

6. A Contractor Site Visit has been scheduled for 0900 hrs on Tuesday, 14 August 2018. All interested MATOC contractors are invited and strongly encouraged to attend. The purpose of the site visit is to enhance your understanding of the task order requirements. This scheduled site visit will be the only one offered. Individual requests for site visits will not be granted. Contractors will be required to email Mr. John “Mark” Baker with the Corps of Engineers’ Mobile District, no later than 1300 hours on 10 August 2018.
Name: Mr. John “Mark” Baker  
Address: 109 Saint Joseph St., Mobile, AL. 36628  
Telephone: (251) 694-3756  
Email: john.m.baker2@usace.army.mil

Contractors must meet at the project site location at the time and date listed above. Questions asked of government personnel at the conference and government personnel responses shall be non-binding. Official responses will only be made to questions formally submitted to the Bidder’s Inquiry Portal in ProjNet at website http://www.projnet.org/projnet.

7. Pricing submitted for this task order shall be good for a period of 120 calendar days after the proposal due date. The Government may request a detailed breakdown of your offer if necessary. The Government reserves the right to conduct discussions, if the Contracting Officer determines that discussions are necessary or are otherwise in the Government's best interest. However, The Government intends to make award on the basis of initial offers, without discussions.

Sincerely,

Kyle M. Rodgers  
Contracting Officer

Attachments:
Request for Information
FAR Clause 52.204-9 – Personal Identity Verification of Contractor Personnel
FAR Clause 52.222-23 – Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity for Construction
Calculation Form for Compliance with FAR 52.236-1
REQUESTS FOR INFORMATION

Any questions about this solicitation, including technical questions about plans and specifications, shall be submitted via the Bidder Inquiry Portal in ProjNet at https://www.projnet.org. Questions should be submitted no later than 20 AUGUST 2018 at 2:00 p.m. Central Time to allow time for a response, and amendment to the solicitation if necessary. On this date and time the portal will be closed. For technical questions, no other means of communication, e-mail, fax, or telephone will be accepted. Oral exchanges between Offerors and the Government prior to award of the contract will not be binding. In addition to information available to Offerors on the Bidder Inquiry Portal, any substantive information or changes concerning this solicitation will be furnished to all Offerors as an amendment to the solicitation if the information is necessary to the submittal of offers or bids.

To submit and review inquiry items, prospective Offerors must use the Bidder Inquiry Key presented below and follow the instructions listed below the key for access. From this page Offerors can view all inquiries for this solicitation or add an inquiry. A prospective Offeror who submits a comment/question will receive an acknowledgment of their comment/question via email, followed by a response to their comment/question posted to the ProjNet system after it has been processed by the USACE technical team.

The Solicitation Number is: W9127818SFH70003

The Bidder Inquiry Key is: FP7872-BGSEP5

Specific Instructions for ProjNet Bid Inquiry Access:
1. From the ProjNet home page linked above, click on Quick Add on the upper right side of the screen.
2. Identify the Agency. This should be marked as USACE.
3. Key. Enter the Bidder Inquiry Key listed above.
4. Email. Enter the email address you would like to use for communication.
5. Click Continue. A page will then open saying that a user account was not found and will ask you to create one using the provided form.
6. Enter your First Name, Last Name, Company, City, State, Phone, Email, Secret Question, Secret Answer, and Time Zone. Make sure to remember your Secret Question and Answer as they will be used from this point on to access the ProjNet system.
7. Click Add User. Once this is completed you are now registered within ProjNet and are currently logged into the system.

Specific Instructions for Future ProjNet Bid Inquiry Access:
1. For future access to ProjNet, you will not be emailed any type of password. You will utilize your Secret Question and Secret Answer to log in.
2. From the ProjNet home page linked above, click on Quick Add on the upper right side of the screen.
3. Identify the Agency. This should be marked as USACE.
4. Key. Enter the Bidder Inquiry Key listed above.
5. Email. Enter the email address you used to register previously in ProjNet.
6. Click Continue. A page will then open asking you to enter the answer to your Secret Question.
7. Enter your Secret Answer and click Login. Once this is completed you are now logged into the system.

Offerors are requested to review the solicitation and amendments in their entirety, as well as to review the Bidder Inquiry Portal for previous questions and responses, prior to submission of a new inquiry on the Portal.

CAUTION: ANY INQUIRY SUBMITTED AND ANSWERED WITHIN THIS SYSTEM, WILL BE ACCESSIBLE TO VIEW BY ALL INTERESTED OFFERORS OR BIDDERS ON THIS SOLICITATION.
The call center for the ProjNet operates weekdays from 8 AM to 5 PM U.S. Central Time. The telephone number is 1-800-428-HELP.

52.204-9 PERSONAL IDENTITY VERIFICATION OF CONTRACTOR PERSONNEL (SEP 2007)


(b) The Contractor shall insert this clause in all subcontracts when the subcontractor is required to have routine physical access to a Federally-controlled facility and/or routine access to a Federally-controlled information system.

(End of clause)

52.222-23 NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY FOR CONSTRUCTION (FEB 1999)

(a) The offerer's attention is called to the Equal Opportunity clause and the Affirmative Action Compliance Requirements for Construction clause of this solicitation.

(b) The goals for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

<table>
<thead>
<tr>
<th>Goals for minority participation for each trade</th>
<th>Goals for female participation for each trade</th>
</tr>
</thead>
<tbody>
<tr>
<td>32.0%</td>
<td>6.9%</td>
</tr>
</tbody>
</table>

These goals are applicable to all the Contractor's construction work performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, the Contractor shall apply the goals established for the geographical area where the work is actually performed. Goals are published periodically in the Federal Register in notice form, and these notices may be obtained from any Office of Federal Contract Compliance Programs office.

(c) The Contractor's compliance with Executive Order 11246, as amended, and the regulations in 41 CFR 60-4 shall be based on (1) its implementation of the Equal Opportunity clause, (2) specific affirmative action obligations required by the clause entitled "Affirmative Action Compliance Requirements for Construction," and (3) its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade. The Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor, or from project to project, for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, Executive Order 11246, as amended, and the regulations in 41 CFR 60-4. Compliance with the goals will be measured against the total work hours performed.

(d) The Contractor shall provide written notification to the Deputy Assistant Secretary for Federal Contract Compliance, U.S. Department of Labor, within 10 working days following award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the --
(1) Name, address, and telephone number of the subcontractor;

(2) Employer's identification number of the subcontractor;

(3) Estimated dollar amount of the subcontract;

(4) Estimated starting and completion dates of the subcontract; and

(5) Geographical area in which the subcontract is to be performed.

(e) As used in this Notice, and in any contract resulting from this solicitation, the "covered area" is ERDC, Vicksburg, MS.

(End of provision)
CALCULATION FORM FOR Work Performed by the Contractor

A. Clearly describe the work to be self performed by the prime contractor:


B. Calculation of Self-Performed Work:

Total Contract Value $____________________
Deduct Subcontracted MEP Value - $____________________
Deduct Prime contractor G&A, home office overhead, markups for profit, bond, taxes, and any other burdens on the labor or materials. - $____________________
Corrected Contract Value B1 $____________________

Identify and give the dollar value of all work being done on the Site by the prime contractor’s own organization and it’s forces, which includes the cost of labor performed and materials brought on site. Exclude all prime contractor G&A, home office overhead, markups for profit, bond, taxes, and any other ODCS or burdens on the labor or materials.

B2 $____________________

Percentage of work done by Prime = B2/B1 X 100%

B2) $____________________/(B1) $____________________ X 100% = _______________________________%

Prime contractors work must be equal to or greater than 15%.
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- **BIDDING SCHEDULE**
- **EXPLANATION OF BID ITEMS**

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  - PROJECT SIGNS
  - ERDC FORM 114
  - DD FORM 1354
  - DD FORM 1354 CHECKLIST
  - WAGE RATES
- 01 32 01.00 10 PROJECT SCHEDULE
- 01 33 00 SUBMITTAL PROCEDURES FOR SUBMITTAL REGISTER
  - SUBMITTAL REGISTER
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- 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS
- 01 42 00 SOURCES FOR REFERENCE PUBLICATIONS
- 01 45 00.00 10 QUALITY CONTROL
  - 01 45 00.15 10 RESIDENT MANAGEMENT SYSTEM CONTRACTOR MODE (RMS CM)
  - SAM FORM 696
- 01 45 35 SPECIAL INSPECTIONS
  - STATEMENT OF SPECIAL INSPECTIONS
  - SCHEDULE OF SPECIAL INSPECTIONS
- 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS
- 01 74 19 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT
- 01 78 23 OPERATION AND MAINTENANCE DATA
- 01 91 00.15 TOTAL BUILDING COMMISSIONING

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- 03 30 53 MISCELLANEOUS CAST-IN-PLACE CONCRETE
- 03 45 33 PRECAST OR PRESTRESSED STRUCTURAL CONCRETE

**DIVISION 04 - MASONRY**

- 04 20 00 UNIT MASONRY

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- 05 05 23.16 STRUCTURAL WELDING
- 05 12 00 STRUCTURAL STEEL
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- **06 41 16.00 10** PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS
- **06 61 16** SOLID SURFACING FABRICATIONS

## DIVISION 07 - THERMAL AND MOISTURE PROTECTION

- **07 17 00** BENTONITE WATERPROOFING
- **07 19 00** WATER REPELLENTS
- **07 21 13** BOARD AND BLOCK INSULATION
- **07 21 16** MINERAL FIBER BLANKET INSULATION
- **07 21 29** SPRAY FOAM INSULATION CLOSED CELL (CC)
- **07 22 00** ROOF AND DECK INSULATION
- **07 27 26** FLUID-APPLIED MEMBRANE AIR BARRIERS
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- **07 60 00** FLASHING AND SHEET METAL
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- **08 33 23** OVERHEAD COILING DOORS
- **08 34 73** SOUND CONTROL DOOR ASSEMBLIES
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- **09 24 23** CEMENT STUCCO
- **09 29 00** GYPSUM BOARD
- **09 30 13** CERAMIC TILING
- **09 51 00** ACOUSTICAL CEILINGS
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- **10 14 00.10** EXTERIOR SIGNAGE
- **10 14 00.20** INTERIOR SIGNAGE
- **10 28 13** TOILET ACCESSORIES
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DIVISION 12 - FURNISHINGS

12 50 00.13 10  FURNITURE AND FURNITURE INSTALLATION
12 59 00  SYSTEMS FURNITURE

DIVISION 13 - SPECIAL CONSTRUCTION

13 48 00.00 10  SEISMIC PROTECTION FOR MECHANICAL EQUIPMENT

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DIVISION 22 - PLUMBING

22 00 00  PLUMBING, GENERAL PURPOSE

DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING

23 00 00  AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEMS
23 03 00.00 20  BASIC MECHANICAL MATERIALS AND METHODS
23 05 15  COMMON PIPING FOR HVAC
23 05 48.00 40  VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT
23 05 93  TESTING, ADJUSTING, AND BALANCING FOR HVAC
23 07 00  THERMAL INSULATION FOR MECHANICAL SYSTEMS
23 09 00  INSTRUMENTATION AND CONTROL FOR HVAC
23 09 13  INSTRUMENTATION AND CONTROL DEVICES FOR HVAC
23 09 23.01  LONWORKS DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS
23 09 93  SEQUENCES OF OPERATION FOR HVAC CONTROL
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25 05 11  CYBERSECURITY FOR FACILITY-RELATED CONTROL SYSTEMS
25 08 10  UTILITY MONITORING AND CONTROL SYSTEM TESTING
25 10 10  UTILITY MONITORING AND CONTROL SYSTEM (UMCS) FRONT END AND INTEGRATION

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26 05 00.00 40  COMMON WORK RESULTS FOR ELECTRICAL
26 05 13.00 40  MEDIUM-VOLTAGE CABLES
26 05 48.00 10  SEISMIC PROTECTION FOR ELECTRICAL EQUIPMENT
26 05 71.00 40  LOW VOLTAGE OVERCURRENT PROTECTIVE DEVICES
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<thead>
<tr>
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<th>Description</th>
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<tbody>
<tr>
<td>26 08 00</td>
<td>APPARATUS INSPECTION AND TESTING</td>
</tr>
<tr>
<td>26 09 23.00 40</td>
<td>LIGHTING CONTROL DEVICES</td>
</tr>
<tr>
<td>26 18 23.00 40</td>
<td>MEDIUM-VOLTAGE SURGE ARRESTERS</td>
</tr>
<tr>
<td>26 20 00</td>
<td>INTERIOR DISTRIBUTION SYSTEM</td>
</tr>
<tr>
<td>26 28 01.00 10</td>
<td>COORDINATED POWER SYSTEM PROTECTION</td>
</tr>
<tr>
<td>26 29 23</td>
<td>VARIABLE FREQUENCY DRIVE SYSTEMS UNDER 600 VOLTS</td>
</tr>
<tr>
<td>26 41 00</td>
<td>LIGHTNING PROTECTION SYSTEM</td>
</tr>
<tr>
<td>26 51 00</td>
<td>INTERIOR LIGHTING</td>
</tr>
<tr>
<td>26 56 00</td>
<td>EXTERIOR LIGHTING</td>
</tr>
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</table>

**DIVISION 27 - COMMUNICATIONS**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>27 05 28.36 40</td>
<td>CABLE TRAYS FOR COMMUNICATIONS SYSTEMS</td>
</tr>
<tr>
<td>27 10 00</td>
<td>BUILDING TELECOMMUNICATIONS CABELING SYSTEM</td>
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</tbody>
</table>

**DIVISION 28 - ELECTRONIC SAFETY AND SECURITY**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>28 31 76</td>
<td>INTERIOR FIRE ALARM AND MASS NOTIFICATION SYSTEM</td>
</tr>
</tbody>
</table>

**DIVISION 31 - EARTHWORK**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>31 11 00</td>
<td>CLEARING AND GRUBBING</td>
</tr>
<tr>
<td>31 23 00.00 20</td>
<td>EXCAVATION AND FILL</td>
</tr>
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**DIVISION 32 - EXTERIOR IMPROVEMENTS**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>32 11 16.16</td>
<td>BASE COURSE FOR RIGID PAVING</td>
</tr>
<tr>
<td>32 11 24</td>
<td>GRADED CRUSHED AGGREGATE BASE COURSE FOR FLEXIBLE PAVEMENT</td>
</tr>
<tr>
<td>32 12 16</td>
<td>HOT-MIX ASPHALT (HMA) FOR ROADS</td>
</tr>
<tr>
<td>32 13 13.06</td>
<td>PORTLAND CEMENT CONCRETE PAVEMENT FOR ROADS AND SITE FACILITIES</td>
</tr>
<tr>
<td>32 17 23</td>
<td>PAVEMENT MARKINGS</td>
</tr>
<tr>
<td>32 92 19</td>
<td>SEEDING</td>
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<tr>
<td>32 92 23</td>
<td>SODDING</td>
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**DIVISION 33 - UTILITIES**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>33 11 00</td>
<td>WATER UTILITY DISTRIBUTION PIPING</td>
</tr>
<tr>
<td>33 30 00</td>
<td>SANITARY SEWERS</td>
</tr>
<tr>
<td>33 40 00</td>
<td>STORM DRAINAGE UTILITIES</td>
</tr>
</tbody>
</table>

--- End of Project Table of Contents ---
BIDDER’S NAME:_______________________________________________________________

**BIDDING SCHEDULE**

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Estimated Quantity</th>
<th>Unit</th>
<th>Estimated Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Base Bid</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Construction of Secure Computing Facility</td>
<td>1</td>
<td>Job</td>
<td>XXX</td>
</tr>
<tr>
<td></td>
<td><strong>Bid Option No. 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Access Floor in Room 110</td>
<td>1</td>
<td>Job</td>
<td>XXX</td>
</tr>
<tr>
<td></td>
<td><strong>Bid Option No. 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Access Floor in Room 113</td>
<td>1</td>
<td>Job</td>
<td>XXX</td>
</tr>
<tr>
<td></td>
<td><strong>Bid Option No. 3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Procurement &amp; Installation of FF&amp;E</td>
<td>1</td>
<td>Job</td>
<td>XXX</td>
</tr>
</tbody>
</table>

Total Base Bid Plus All Bid Options

---

Signature Certification _______________ Date of Certification _______________

The Offeror’s signature above certifies that his/her firm has included all MATOC CLIN prices for this Task Order proposal, in order to arrive at an overall proposed price for this Task Order.
NOTES FOR BIDDING SCHEDULE

NOTE NO. 1. To better facilitate the receipt and proposal process, all modifications to proposals are to be submitted on copies of the latest bid schedule as published in the solicitation or the latest amendment thereto. In lieu of indicating additions/deductions to contract line items, all bidders should state their revised prices for each item. The company name should be indicated on the face of the bidding schedule to preclude being misplaced.

NOTE NO. 2. Bidders must insert a price on all numbered items of the Bidding Schedule. Failure to do so will disqualify the bid.

NOTE NO. 3. If a modification to a bid is submitted and provides for a job adjustment to the total estimated cost, the application of the job adjustment to each unit price and/or job price, in the bid schedule must be stated or, if it is not stated, the bidder agrees that the job adjustment shall be applied on a pro rata basis to every bid item in the bid schedule.

NOTE NO. 4. CONDITIONS GOVERNING EVALUATION OF BIDS AND AWARD OF TASK ORDERS.

Only one task order will be awarded on this Bid Schedule in accordance with the RFP Letter. Award will be made on the Base Bid and selected Options. Evaluation of Base Bid and all Options shall be in accordance with the following clause:

52.217-5 EVALUATION OF OPTIONS (JUL 1990)

Except when it is determined in accordance with FAR 17.206(b) not to be in the Government's best interests, the Government will evaluate offers for award purposes by adding the total price for all options to the total price for the basic requirement. Evaluation of options will not obligate the Government to exercise the option(s).

(End of clause)

The Government may require the delivery of the number line items, identified in the schedule as option items, in the quantity and the price stated in the schedule. Subject to the availability of funds, the Contracting Officer may exercise the option by written notice to the Contractor within 120 days of Notice to Proceed.

NOTE NO. 5. ADDITIONAL SUBMISSION REQUIREMENTS:

a. Upon the Government’s request, the offeror shall submit a price breakdown of the bid items directly to the Mobile District Office. Details on where and how to send the breakdown will be provided by the requesting official making the request on behalf of the Government. The format of the breakdown will be left up to the offeror. However, as a minimum, the offeror shall provide pricing for the major categories of work under each bid item, for example: site improvements, landscaping, electrical, mechanical, etc. This information will not be needed sooner than three (3) working days after the proposal submission due date.

b. This information may be required for the initial and, if requested, for any revised proposals.
NOTE NO. 6. CHECKLIST FOR THE BIDDING SCHEDULE:

a. Is it completely filled out? Y__ NA__

b. It may not be altered either as to quantities or as to items offered. Y__ NA__

c. There can be no language of limitation either as to quantities or as to items offered. Y__ NA__

d. If you corrected your numbers, have you initialed these corrections? Y__ NA__

e. If the bidding schedule has been changed by Amendment, is the bidding schedule that you are submitting from the most recent amendment? Y__ NA__

f. Do prices for each bid item include all costs, mark-ups and taxes (if any taxes are imposed)? Y__ NA__

g. Is the cost of obtaining your performance and payment bond included in the total bid price specified on the bid schedule? Y__ NA__

h. In preparing your bid, remember the Corps does not make advanced payments on its contracts Y__ NA__

END OF BIDDING SCHEDULE
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EXPLANATION OF BID ITEMS

GENERAL: This section comprises an explanation of the bid items identified in the bid schedule for each item of work. The bid schedule and the contract drawings shall be worked together to identify the various items of work to which each bid item will apply. The Contractor shall bid the work under the applicable bid item for the specific areas identified in the bid schedule. All work specified herein shall be accomplished in accordance with the requirements of the technical provisions of the specifications and the contract drawings. Payment described for the various bid items will be full compensation for all labor, materials, and equipment required to complete the work. Compensation for any item of work described in the contract but not listed in the bid schedule shall be included in the payment for the item of work to which it is made subsidiary.

BASE BID

Payment under Bid Item No. 1 “Construction of Secure Computing Facility” will constitute full compensation for furnishing all materials, plant, tools, labor, and associated incidentals necessary to complete the construction of the new building and site work for the Secure Computing Facility, as identified in the task order drawings and specifications.

BID OPTION NO. 1

Payment under Bid Item No. 2 “Access Floor in Room 110” will constitute full compensation for furnishing all materials, plant, tools, labor, and associated incidentals necessary to complete the procurement and installation of the Raised Access Flooring in Room 110 of Secure Computing Facility, as identified in the task order drawings and specifications.

BID OPTION NO. 2

Payment under Bid Item No. 3 “Access Floor in Room 113” will constitute full compensation for furnishing all materials, plant, tools, labor, and associated incidentals necessary to complete the procurement and installation of the Raised Access Flooring in Room 113 of Secure Computing Facility, as identified in the task order drawings and specifications.

BID OPTION NO. 3

Payment under Bid Item No. 4 “Procurement & Installation of FF&E” will constitute full compensation for furnishing all materials, plant, tools, labor, and associated incidentals necessary to complete the procurement and installation of Furniture, Fixtures and Equipment associated with the Secure Computing Facility, as identified in the task order drawings and specifications.

--END OF SECTION--
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PART 1   GENERAL

1.1   COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK

The Contractor shall be required to (1) commence work under this contract(s) within 8 calendar days after the date the Contractor receives the notice to proceed, (2) prosecute the work diligently, and (3) complete the entire work ready for use not later than the number of calendar days stated in the RFP Letter after receipt of notice to proceed. This time stated for completion shall include final cleanup of the premises.

Due to settlement concerns of in-situ subgrade, the Contractor shall be required to surcharge the project site and allow a settlement period not to exceed 6 months. Contractor shall monitor settlement and prepare settlement plots IAW project specifications during the settlement period. Based on the settlement plots, the Government will determine when acceptable settlement has occurred. The Resident Engineer will provide a written notice to the Contractor that settlement has occurred and surcharge may be removed and project finished. The Government anticipates settlement will occur within 6 months of surcharging.

1.2   LIQUIDATED DAMAGES--CONSTRUCTION

(a) If the Contractor fails to complete the work within the time specified in the contract, the Contractor shall pay liquidated damages to the Government in the amount of $431.00 for each calendar day of delay until the work is complete or accepted.

(b) If the Government terminates the Contractor's right to proceed, liquidated damages will continue to accrue until the work is completed. These liquidated damages are in addition to excess costs of repurchase under the Termination clause.

1.3   SECURITY REQUIREMENTS

(a) All contractor and all associated subcontractors employees shall comply with applicable installation, facility and area commander installation/facility access and local security policies and procedures (provided by government representative). The contractor shall also provide all information required for background checks to meet installation access requirements to be accomplished by installation Provost Marshal Office, Director of Emergency Services or Security Office. Contractor workforce must comply with all personal identity verification requirements as directed by DOD, HQDA and/or local policy. In addition to the changes otherwise authorized by the changes clause of this contract, should the Force Protection Condition (FFCON) at any individual facility or installation change, the Government may require changes in contractor security matters or processes.

(b) The contractor and all associated subcontractors shall brief all employees on the local iWATCH, Corps Watch, or See Something, Say Something program (training standards provided by the requiring activity ATO). This local developed training will be used to inform employees of the types of
behavior to watch for and instruct employees to report suspicious activity to the COR. This training shall be completed within 30 calendar days of contract award and within 30 calendar days of new employees commencing performance with the results reported to the COR NLT 5 calendar days after contract award.

(c) All contract employees, including subcontractor employees who are not in possession of the appropriate security clearance, will be escorted in areas where they may be exposed to classified and/or sensitive materials and/or sensitive or restricted areas.

(d) Personnel Security Screening. The Contractor shall conduct a security screening on every employee prior to their performance under this contract. The security screening shall cover the most recent five (5) years or since age 18, whichever is shorter, providing it includes the most recent two (2) years of the applicant's life. The security screening shall include, as a minimum, checks with former employers, former supervisors and personal references, along with a local record check with police departments. The Contractor shall furnish the Contracting Officer with a record of the results of each employee's security screening prior to entry on duty.

1.4 FOR OFFICIAL USE ONLY (FOUO) INFORMATION

Excerpt from AR 380-5, Chapter 5, Controlled Unclassified Information, Section I

For Official Use Only Information (FOUO)

"5-3. Marking

a. Information which has been determined to qualify for FOUO status should be indicated, by markings, when included in documents and similar material. Markings should be applied at the time documents are drafted, whenever possible, to promote proper protection of the information.

b. Wholly unclassified documents and material containing FOUO information will be marked as follows:
   (1) Documents will be marked "FOR OFFICIAL USE ONLY," in letters larger than the rest of the text, where practical, at the bottom of the front cover (if there is one), the title page (if there is one), the first page, and the outside of the back cover (if there is one).

   (2) Pages of the document which contain FOUO information will be marked "FOR OFFICIAL USE ONLY" at the bottom.

   (3) Material other than paper documents, for example, slides, computer media, films, etc., will bear markings which alert the holder or viewer that the material contains FOUO information.

   (4) FOUO documents and material, transmitted outside the Department of Defense, must bear an expanded marking on the face of the document so that non-DOD holders understand the status of the information. A statement similar to this one should be used: This document contains information Exempt from mandatory disclosure under the FOIA. Exemption(s) (indicate the exemption(s)) apply.

c. NOT USED.
d. Transmittal documents which have no classified material attached, but do have FOUO attachments, will be marked with a statement similar to this one: "FOR OFFICIAL USE ONLY ATTACHMENT."

e. Each part of electronically transmitted messages containing FOUO information will be marked appropriately. Unclassified messages containing FOUO information will contain the abbreviation "FOUO" before the beginning of the text.

5-4. Access to FOUO information

FOUO information can be disseminated within DOD components and between officials of Army components and Army contractors, consultants, and grantees, as necessary, in the conduct of official business. FOUO information can also be released to officials in other departments and agencies of the Executive and Judicial Branches in performance of a valid government function. Special restrictions can apply to information covered by the Privacy Act. Release of FOUO information to members of Congress is covered by DODD 5400.4 and to the General Accounting Office by DODD 7650.1.

5-5. Protection of FOUO information

a. During working hours, reasonable steps should be taken to minimize risk of access by unauthorized personnel. After working hours, FOUO information can be stored in unlocked containers, desks or cabinets if U.S. Government or U.S. Government-contract building security is provided, or in locked desks, file cabinets, bookcases, or similar items.

b. FOUO documents and material can be transmitted via first class mail, parcel post, or, for bulk shipments, fourth class mail. Electronic transmission of FOUO information by voice, data, facsimile or similar means, should be by approved secure communications systems whenever possible.

c. Record copies of FOUO documents will be disposed of in accordance with AR 25-400-2. Non-record FOUO documents can be destroyed by shredding or tearing into pieces and discarding the pieces in regular trash containers."

1.5 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-01 Preconstruction Submittals

Environmental Release; G,CD.

Electronic Mail System Plan; G,CD.

Layout of Temporary facilities; G,CD.

Work Clearance Request; G,CD

Hazard Analysis; G,SO.

Construction Sequence Plan; G,CD
1.6  CONTRACT DRAWINGS, MAPS AND SPECIFICATIONS

a) The Contractor will be furnished one CD-ROM containing a reproducible copy of the advertised solicitation, including contract clauses, plans and specifications. The work shall conform to the specifications and the contract drawings listed in the technical provisions.

b) Omissions from the drawings or specifications, the mis-description of details of work which are manifestly necessary to carry out the intent of the drawings and specifications which are customarily performed shall not relieve the Contractor from performing such omitted or mis-described details of the work but they shall be performed as if fully and correctly set forth and described in the drawings and specifications.

c) The Contractor shall check all drawings furnished him immediately upon their receipt and shall promptly notify the Contracting Officer's Representative of any discrepancies. Figures marked on drawings shall in general be followed in preference to scale measurements. Large scale drawings shall in general govern small scale drawings. The Contractor shall compare all drawings and verify the figures before laying out the work and will be responsible for any errors which might have been avoided thereby.
d) The list of drawings and maps provided in the Index Sheet of the Plans for this solicitation are hereby incorporated by reference into these specifications. Any schedules included in the drawings are for the purpose of defining requirements other than quantities.

NOTE: Refer to the folio of drawings for the index of drawings in this solicitation.

1.7 PHYSICAL DATA

Data and information furnished or referred to below is for the Contractor's information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

a. The indications of physical conditions on the drawings and in the specifications are the result of site investigations by surveys.

b. Weather Conditions. Weather conditions shall be investigated by the Contractor to determine the hazards likely to arise therefrom. Complete weather records and reports may be obtained from the local U.S. Weather Bureau.

c. Transportation facilities. The contractor shall investigate and make arrangements for transporting all materials and equipment to the site of work.

1.8 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

a. This provision specifies the procedure for determination of time extensions for unusually severe weather in accordance with the contract clause entitled "Fixed Price Construction". In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:

b. The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.

1. The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the Contractor.

2. The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

<p>| MONTHLY ANTICIPATED ADVERSE WEATHER DELAY |
| WORK DAYS BASED ON (5) DAY WORK WEEK |</p>
<table>
<thead>
<tr>
<th>JAN</th>
<th>FEB</th>
<th>MAR</th>
<th>APR</th>
<th>MAY</th>
<th>JUN</th>
<th>JUL</th>
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<th>NOV</th>
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</table>

Upon acknowledgment of the Notice to Proceed (NTP) and continuing throughout the contract, the Contractor will record on the daily CQC
report, the occurrence of adverse weather and resultant impact to normally schedule work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day.

c. The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph 2, above, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the Contract Clause entitled "Default (Fixed Price Construction)".

1.9 TIME EXTENSIONS

Notwithstanding any other provisions of this contract, it is mutually understood that the time extensions for changes in the work will depend upon the extent, if any, by which the changes cause delay in the completion of the various elements of construction. The change order granting the time extension may provide that the contract completion date will be extended only for those specific elements so delayed and that the remaining contract completion dates for all other portions of the work will not be altered and may further provide for an equitable readjustment of liquidated damages under the new completion schedule.

1.10 CONTRACTOR PREPARED AS-BUILT DRAWINGS

a) General. In accordance with SPECIAL CONTRACT REQUIREMENT paragraph: CONTRACT DRAWINGS, MAPS AND SPECIFICATIONS, the Government will furnish the Contractor on CD ROM one electronic set of solicitation drawing files and any amendments for use in preparation of as-built drawings by the Contractor. Copies of the drawings will be the responsibility of the Contractor. The As-Built drawings shall be a record of the construction as installed and completed by the Contractor. They shall include all the information shown on the contract set of drawings and a record of all deviations, modifications, or changes from those drawings, however minor, which were incorporated in the work, all additional work not appearing on the contract drawings, and all changes which are made after final inspection of the contract work. In the event the Contractor accomplishes additional work which changes the As-Built conditions of the facility after submission of the as-built drawings, the Contractor shall furnish revised and/or additional drawings as required to depict as-built conditions. The requirements for these additional drawings will be the same as for the as-built drawings included in the original submittal.

b) Red Line As-Built Drawings. The Contractor shall have on his staff, personnel to mark up a set of paper copy construction drawings to show the As-Built conditions. These As-Built marked copies shall be kept current and available on the jobsite at all times. All changes from the contract plans which are made in the work or additional information which might be uncovered in the course of construction shall be accurately and neatly recorded, as the events occur, by means of details and notes. The Contractor shall call attention to entries by redlining areas affected. The red line As-Built will be jointly inspected for accuracy and completeness by the Contracting Officer's representative and a responsible representative of the Contractor prior to submittal of each request for payment. The Contracting Officer's Representative's approval of the
current status of the as-built drawings shall be a prerequisite to the Contracting Officer's Representative's approval of request for progress payment and request for final payment under the contract. The drawings shall show the following information, but not be limited thereto:

(1) The location and description of any utility lines or other installations of any kind or description known to exist within the construction area. The location includes dimensions to permanent features.

(2) The location and dimensions of any changes within the building or structures.

(3) Correct grade or alignment of roads, structures or utilities if any changes were made from contract plans.

(4) Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.

(5) All changes or modifications which result from the final inspection.

(6) Options: Where contract drawings or specifications allow options, only the option selected for construction shall be shown on the As-Built drawings.

(7) Extensions of Design: Shop Drawings such as structural fabrication and erection drawings, fire alarm systems, and sprinkler systems that will require extensive redrafting effort in order to create an electronic set will not be required to be incorporated into the electronic set. They will be included as an Appendix to the paper copy set.

c) Submittal of As-Built Drawings for Review and Approval: The Contractor shall participate in monthly review meetings with the Contracting Officer's Representative to show the progress made the preceding month and make all required changes. At time of final construction inspection, the Contractor shall submit one copy of the red lined As-Built drawings to the Contracting Officer's Representative for his review and approval. The As-Built drawings shall be certified as to their correctness by the signature of an authorized representative of the Contractor. Upon Government approval of the Contractor's red-lined copy of the As-Built drawings, the Contractor shall prepare and provide one full size paper copy and four electronic sets of As-Built drawings by incorporating the red line marked up notations on the construction drawings into the electronic set of solicitation drawings and amendments. The electronic sets of the As-Built drawings shall be submitted on CD-ROM. The CD-ROM shall also contain the information contained on the project's Advertised CD-ROM including specifications and original contract drawings, Amendment, Design Analysis, and the original survey data. Submittals are to be submitted to the Contracting Officer's Representative not later than ten (10) calendar days after project completion date. The Contracting Officer's Representative will provide the full size paper set of drawings and one copy of the CD-ROM to the BCE Office. For the remaining three copies of the CD-ROM, one copy shall be kept at the Resident Office, one copy shall be provided to CESAM-EN-D (Project Architect/Engineer) and the other provided to CESAM-EN-DW (Project Support Section).

d) Final Electronic Drawing Format
(1) The solicitation drawing files and any amendments thereto will be furnished to the Contractor in electronic format. The solicitation drawing files have been prepared in Revit 2016, AutoCAD Civil 3D 2018 and AutoCAD 2017 format. The drawing file indicates the format which the drawing was developed. The Contractor shall revise/redraft each solicitation drawing and/or amendment drawing to reflect all changes made during construction as indicated by the red line marked up notations on the construction drawings. Revisions/redrafting shall match the font styles, sizes, and formats; line weights/thicknesses and styles/types; and all other drafting elements used on the solicitation drawing/amendments. All elements must be incorporated into each as-built drawing file; the use of reference files shall not be permitted.

(2) All revisions made to the solicitation drawings and/or amendment drawings to reflect changes made during construction shall be flagged and shall have the revision block completed as follows. The entry in the description column of the revision block shall read "AS-BUILT". The date of the revision and one approving initial from a responsible person within the Contractor's Firm shall also be included in the revision block. Above the drawing title block the drawing will be labeled in bold letters "AS-BUILT". The flagged changes and revision block format shall be in accordance with the examples shown in the Mobile District Design Manual located on the Internet at


The Contractor shall also furnish a revised index of drawings to match the actual design drawings. The drawing title blocks shall be in a uniform format to match the requirements as specified in the Design Manual.

e) Submittal of As-Built Drawings:

(1) The Contractor shall submit As-Built Drawings for all exterior utilities within thirty (30) days of utility installation. The Contractor shall submit three (3) full size paper copies and one (1) electronic copy of each contract drawing showing the utilities to the Contracting Officer's Representative. The As-Built drawings shall be prepared as described below except the drawings shall be labeled "Interim As-Builts". The drawings submitted as part of the As-Built submitted shall again be prepared and submitted along with the As-Built drawings provided at the end of the project.

(2) The Contractor shall participate in monthly review meetings with the Contracting Officer's Representative to show the progress made the preceding month and make all required changes. At the time of the Final Construction Inspection, the Contractor shall submit one copy of the red-lined As-Built drawings to the Contracting Officer's Representative for his review and approval. Another set of red-lined drawings shall be required when all work including changes is physically complete. The As-Built drawings shall be certified as to their correctness by the signature of an authorized representative of the Contractor.

(3) Upon Government approval of the Contractor's red-lined copy of the As-Built drawings, the Contractor shall prepare and provide one (1) unbound full size mylar copy and six (6) electronic sets of As-Built drawings by incorporating the red line marked up notations on the construction drawings.
into the electronic set of solicitation drawings and amendments. The electronic sets of the As-Built drawings shall be submitted on CD-ROM. The CD-ROM shall also contain the information contained on the project's Advertised CD-ROM including specifications and original contract drawings, Amendment, Design Analysis, and the original survey data. The Contractor shall provide As-Built Submittals not later than ten (10) calendar days after the project completion date. The Contracting Officer's Representative will provide the full size paper set of drawings and one copy of the CD-ROM to the BCE Office. Additional distribution of As-Builts is as follows:

a. Two electronic sets and one full size paper set to the DPW: Lamar Jenkins, Director, DPW, 3909 Halls Ferry Road, Vicksburg, MS 39180, (601)634-2269.

b. One electronic set to the Construction Resident Engineer: Arthur Hurst, ERDC USACE Resident Office, 3909 Halls Ferry Road, Vicksburg, MS 39180, (601) 634-4392.

c. One electronic set to the Mobile District Project Manager: J. Mark Baker, PM-M, U.S. Army Corps of Engineers - Mobile District, 109 Saint Joseph Street, Mobile, AL 36602, (251)694-3756, john.m.baker2@usace.army.mil.

d. One electronic set to the Mobile District Project Engineer: Dan Bush, EN-DA, U.S. Army Corps of Engineers - Mobile District, 109 Saint Joseph Street, Mobile, AL 36602, daniel.e.bush@usace.army.mil.

e. One electronic set to the Mobile District Project Support Section: Nicholas J. Stafford; EN-TS, U.S. Army Corps of Engineers - Mobile District, 109 St. Joseph Street, Mobile, AL 36602; (251)690-2634 nicholas.j.stafford@usace.army.mil

f) Payment: No separate payment will be made for the as-built drawings required under this contract, and all costs in connection there-with will be considered a subsidiary obligation of the Contract.

1.11 NOT USED

1.12 SHOP DRAWINGS

Shop Drawings must be submitted in electronic format via email. When Electronic Shop Drawings are utilized, all documents shall be printed or scanned to Portable Document Format (PDF) files of a size suitable for emailing. Files shall be named in accordance with the Unified Guide Specification (UFGS) numbering system. All information including drawings, manufacturer's data, catalog cut sheets, and calculations output from computer program software shall be printed or scanned to be clearly legible, and capable of being reproduced using a standard desktop or office printer. Manufacturer's data, catalog cut sheets, and calculations output from computer program software shall be configured to print to 8 ½" x 11" paper. Scaled drawings shall be configured to print half-size to 11" x 17". The scale for drawings generated from floor plans shall be no less than 1/8" per foot (1/16" per foot when printed half-size).

1.13 MARKING MECHANICAL DEVICES FOR MAINTENANCE

Any valves, VAVs, dampers, or other mechanical device that Maintenance
Personnel may need access to shall be marked on the ceiling grid with an approved marking system. A laminated index of the markings shall be placed in the Mechanical Room.

1.14 TESTING AND BALANCING FOR HVAC SYSTEMS

The Construction Contractor shall retain the services of an Independent Firm for Testing and Balancing (TAB) HVAC Systems as specified in SECTION: 23 05 93 TESTING, ADJUSTING, AND BALANCING OF HVAC SYSTEMS. Firm shall be either a member of the Associated Air Balance Council (AABC) or certified by the National Environmental Balancing Bureau (NEBB). The TAB Firm shall be a subcontractor of the prime contractor, and shall report to and be paid by the prime contractor.

1.15 TRAINING

For all training required for a specific equipment item or system being constructed or installed as part of the project, the training course curriculum, agenda, and training date shall be submitted for approval a minimum of 21 days prior to the date of the proposed training or as noted in the technical specifications herein. As a minimum, the contractor shall train Base Shop personnel on Intrusion Detection Systems (IDS), Cathodic Protection systems, Fire Alarm / Mass notification Systems (FA/MNS), irrigations systems, and Direct Digital Control (DDC) systems as applicable to the project.

1.16 BULLETIN BOARD

Refer to Section 00800 in the Parent MATOC Contract for the bulletin board.

1.17 COLOR BOARDS

Three (3) sets of color boards shall be submitted within 120 days after receipt of Notice to Proceed for all projects which involve building construction or building modifications. Each set of boards shall include samples of colors and finishes for both interior and exterior surfaces. Heavy or bulky samples and materials may be presented by clear color photographs which indicate actual colors and textures. Samples will be presented on 8-1/2" X 11" boards (modules) with a maximum spread of 25-1/2" X 33" for foldouts. The modules shall be designed to fit in a standard loose-leaf three-ring binder. Where special finishes such as architectural concrete, carpet or prefinished textured metal panels are required, samples not less than 12 inches square shall be submitted with the board. The project name and location shall occur at the top of each module, and the location of the colors and/or samples, whether interior or exterior, shall be stated thereon. Each set of boards shall include an index module. The Contractor shall certify that he has reviewed the color samples in detail and that they are in strict accordance with the contract drawings and specifications, except as may be otherwise explicitly stated. Submittal of the color samples shall not relieve the contractor of the responsibility to submit the samples required by the Technical Provisions.

1.18 LAYOUT OF WORK

The Contractor shall lay out its work from Government-established base lines and bench marks indicated on the drawings, and shall be responsible for all measurements in connection with the layout. The Contractor shall furnish, at its own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the work. The
Contractor shall be responsible for executing the work to the lines and grades that may be established or indicated by the Contracting Officer. The Contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the Contracting Officer until authorized to remove them. If such marks are destroyed by the Contractor or through its negligence before their removal is authorized, the Contracting Officer may replace them and deduct the expense of the replacement from any amounts due or to become due to the Contractor.

1.19 WARRANTY OF CONSTRUCTION

(a) In addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph (i) of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or design furnished, or workmanship performed by the Contractor or any subcontractor or supplier at any tier.

(b) This warranty shall continue for a period of 1 year from the date of final acceptance of the work. If the Government takes possession of any part of the work before final acceptance, this warranty shall continue for a period of 1 year from the date the Government takes possession.

(c) The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Government-owned or controlled real or personal property, when that damage is the result of--

(1) The Contractor's failure to conform to contract requirements; or
(2) Any defect of equipment, material, workmanship, or design furnished.

(d) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for 1 year from the date of repair or replacement.

(e) The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage.

(f) If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the Government shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

(g) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall--

(1) Obtain all warranties that would be given in normal commercial practice;
(2) Require all warranties to be executed, in writing, for the benefit of the Government, if directed by the Contracting Officer; and
(3) Enforce all warranties for the benefit of the Government, if directed by the Contracting Officer.

(h) In the event the Contractor's warranty under paragraph (b) of this clause has expired, the Government may bring suit at its expense to enforce a subcontractor's, manufacturer's, or supplier's warranty.

(i) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material or design furnished by the Government nor for the repair of any damage that results from any defect in Government-furnished material or design.

(j) This warranty shall not limit the Government's rights under the Inspection and Acceptance clause of this contract with respect to latent defects, gross mistakes, or fraud.
1.20 ENFORCEMENT OF WARRANTIES

a. Performance Bond.
1. It is understood that the Contractor's Performance Bond will remain effective throughout the life of all warranties and warranty extensions, except when the warranty period for a particular item extends beyond the one year after contract completion.
2. In the event the Contractor or his designated representative fails to commence and diligently pursue any work required under the Special Clause entitled "Warranty of Construction" within a reasonable time after receipt of written notification pursuant to the requirements thereof, the Contracting Officer shall have a right to demand that said work be performed under the Performance Bond by making written notice on the surety. If the surety fails or refuses to perform the obligation it assumed under the Performance Bond, the Contracting Officer shall have the work performed by others, and after completion of the work, shall make demand for reimbursement of any or all expenses incurred by the Government while performing the work, including, but not limited to administrative expenses.
3. Warranty repair work which arises to threaten the health or safety of personnel, the physical safety of property or equipment, or which impairs operations, habitability of living spaces, etc., will be handled by the Contractor on an immediate basis as directed verbally by the Contracting Officer or his authorized representative. Written verification will follow verbal instructions. Failure of the Contractor to respond as verbally directed will be cause for the Contracting Officer or his authorized representative to have the warranty repair work performed by others and to proceed against the Contractor as outlined in paragraph b, above.

b. Pre-Warranty Conference. Prior to contract completion and at a time designated by the Contracting Officer or his authorized representative, the Contractor shall meet with the Contracting Officer to develop a mutual understanding with respect to the requirements of the Special Clause entitled "Warranty of Construction" of this specification. Communication procedures for Contractor notification of 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 or his authorized representative for the execution of the construction warranty shall be established/reviewed at this meeting. In connection with these requirements and at the time of the Contractor's quality control completion inspection, the Contractor will furnish the name, telephone number and address of a licensed and bonded company which is authorized to initiate and pursue warranty work action on behalf of the Contractor. This single point of contract will be located within the local service area of the warrantied construction, will be continuously available, and will be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any of his responsibilities in connection with the Special Clause entitled "Warranty of Construction."

1.21 CERTIFICATES OF COMPLIANCE

Any certificates required for demonstrating proof of compliance of materials with specification requirements shall be executed in four copies. Each certificate shall be signed by an official authorized to certify on behalf of the manufacturing company and shall contain the name and address of the Contractor, the project name and location, and the quantity and date or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates shall contain the address of the testing laboratory and the date or dates of the tests to which the report applies. Certification
shall not be construed as relieving the Contractor from furnishing satisfactory material, if, after tests are performed on selected samples, the material is found not to meet the specific requirements.

1.22 TEMPORARY ELECTRICAL SERVICE

All temporary electrical service on the project, and within all temporary and permanent structures shall be installed and maintained in compliance with the provisions of EM 385-1-1, latest edition, Corps of Engineers Safety and Health Requirements, and APPENDIX T of Mobile District Regulation 385-1-1, Electrical Service Requirements for Construction and Maintenance Operations. Copies of these publications are available for inspection in the District Office by Prospective bidders, and will be furnished to the successful bidder.

1.23 PRESERVATION OF HISTORICAL, ARCHEOLOGICAL AND CULTURAL RESOURCES

   a. If known historical, archeological and cultural resources exist within the Contractor's work area, they have been designated on the contract drawings. The Contractor shall install protection for these resources as shown on the drawings and shall be responsible for their preservation during the contract.

   b. If, during construction activities, the Contractor observes items that might have historical or archeological value, such observations shall be reported immediately to the Contracting Officer so that the appropriate authorities may be notified and a determination can be made as to their significance and what, if any, special disposition of the finds should be made. The Contractor shall cease all activities that may result in the destruction of these resources and shall prevent his employees from trespassing on, removing, or otherwise damaging such resources.

1.24 WORK IN QUARANTINED AREA

The work called for by this contract involves activities in counties quarantined by the Department of Agriculture to prevent the spread of certain plant pests which may be present in the soil. The Contractor agrees that all construction equipment and tools to be moved from such counties shall be thoroughly cleaned of all soil residues at the construction site with water under pressure and that hand tools shall be thoroughly cleaned by brushing or other means to remove all soil. In addition, if this contract involves the identification, shipping, storage, testing, or disposal of soils from such a quarantined area, the Contractor agrees to comply with the provisions of ER 1110-1-5 and attachments, a copy of which will be made available by the Contracting Officer's representative upon request. The Contractor agrees to assure compliance with this obligation by all subcontractors.

1.25 EQUIPMENT DATA

   a. Major Equipment. The Contractor shall be required to make a list of all installed equipment furnished under this contract. This list shall include but not be limited to each piece of equipment which has a serial number. This list shall include all information usually listed on manufacturer's name plate, so as to positively identify the piece of property. This list shall also include the cost of each piece of installed property (less installation costs) F.O.B. construction site. The above referenced list shall be furnished as soon as possible after equipment is purchased. The list shall be furnished as one (1) reproducible and three (3) copies and shall be furnished to Contracting Officer not later than
thirty calendar days prior to completion of any segment of the contract work which has an incremental completion date. Listing will be on Government furnished MOB Form 897, available from the Contracting Officer.

b. Other Equipment. The Contractor will be required to furnish a brochure, catalog cut, parts list, manufacturer's data sheet or other publication (including the manufacturer's name and address) which will show detailed parts data on all other equipment, such as hardware, plumbing and lighting fixtures, etc., subject to repair and maintenance procedures. The data shall be furnished in four (4) copies to the Contracting Officer not later than thirty calendar days prior to completion of any segment of the contract work which has an incremental completion date.

1.26 SCHEDULE OF AVAILABLE UTILITIES

In accordance with paragraph entitled availability and use of utility services, the Government will make available at no cost to the Contractor, only water from existing distribution lines, outlets and supplies. It shall be the Contractor's responsibility to install and maintain all necessary temporary connections and distribution lines for his own use. Any other required utilities shall be furnished by the Contractor at his expense.

1.27 AVAILABILITY AND USE OF UTILITY SERVICES

a. The Government will make all reasonably required amounts of water utility available to the Contractor from existing outlets and supplies, as specified in the contract. The amount of other utility services consumed shall be charged to or paid for by the Contractor at prevailing rates charged to the Government or, where the utility is produced by the Government, at reasonable rates determined by the Contracting Officer's representative. The Contractor shall carefully conserve any utilities furnished without charge.

b. The Contractor, at its expense and in a workmanlike manner satisfactory to the Contracting Officer's representative, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of each utility used for the purpose of determining charges. Before final acceptance of the work by the Government, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia.

1.28 HAZARDOUS MATERIALS AND WASTES MANAGEMENT

All hazardous materials and waste resulting from the construction of this project shall be managed in accordance with local, state, federal and ERDC, Vicksburg, MS rules and regulations. All universal waste such as spent fluorescent lamps, batteries, mercury thermostats, smoke detectors, and mercury switches must be managed and handled in accordance with the above-mentioned directives. Hazardous materials and waste such as fuels and oils of all types, used tires, computer monitors, all electronic devices, aerosol spray cans (including empties), paints, adhesives, corrosives, nonflammable and non corrosional cleaners, hydraulic fluid, antifreeze, etc. must be managed in accordance with above-mentioned compliance agencies. The Contractor's Quality Control Manager shall contact the Base Environmental Office if handling procedures for hazardous waste and materials is unclear.
The use of fuel storage tanks on Base must be approved by the Base Environmental Office. Temporary gasoline storage will NOT be permitted on Base. Any tank, container, or equipment with an oil or fuel capacity of 55 gallons or more approved for use on Base shall have a means of secondary containment, spill containment (spill kits), and/or spill procedures in place that prevents the flow of spilled oil or hazardous materials into navigable waters.

Contractor vehicle and heavy equipment maintenance (including oil changing, lubrication, and vehicle washing) is not authorized on base.

1.29 HAZARDOUS OR TOXIC MATERIAL SPILLS

Within ten (10) days of Notice To Proceed (NTP), the Contractor shall prepare a Spill Prevention Control and Countermeasures (SPCC) Plan in accordance with CFR 40 Part 112 to address spill prevention and countermeasures for tanks and heavy equipment used on Base. See additional requirements provided in specification Section 01 57 20 ENVIRONMENTAL PROTECTION.

Any fuel, oil, hydraulic fluid, chemical, or other hazardous or toxic material spill on Base shall be reported to the Base Environmental Office through the Contracting Officer's Representative regardless of the amount.

1.30 CONSTRUCTION DEBRIS DISPOSALS

All construction debris shall be disposed of at an approved disposal site off Government controlled lands except as specified in Section 02 41 00 DEMOLITION.

1.31 IDENTIFICATION OF EMPLOYEES

The Contractor shall be responsible for furnishing an identification badge card to each employee prior to the employee's work on-site, and for requiring each employee engaged on the work to display such identification as may be approved and directed by the Contracting Officer. All prescribed identification shall immediately be delivered to the Contracting Officer for cancellation upon the release of any employee. When required by the Contracting Officer, the Contractor shall obtain and submit fingerprints of all persons employed or to be employed on the project.

1.32 PAYMENT FOR MATERIALS DELIVERED OFFSITE

a. Pursuant to FAR Clause 52.232-5, "Payment Under Fixed-Price Construction Contracts," materials delivered to the Contractor at locations other than the site of the work may be taken into consideration in making payments if included in payment estimates and if all the conditions of the contract clauses are fulfilled. Payment for items delivered to locations other than the work site will be limited to (1) materials required by the technical provisions; or (2) materials that have been fabricated to the point where they are identifiable to an item of work required under this contract.

b. Such payment will be made only after receipt of paid or receipted invoices or invoices with canceled check showing title to the items in the prime contractor and including the value of materials and labor incorporated into the item. Petroleum products, including fuel, will be considered for payment as a material delivered offsite.
1.33 EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE

a. This clause does not apply to terminations. See 52.249-5000, Basis for Settlement of Proposals, and FAR Part 49.

b. Allowable cost for construction and marine plant and equipment in sound workable condition owned or controlled and furnished by a contractor or subcontractor at any tier shall be based on actual cost data for each piece of equipment or groups of similar serial and series for which the Government can determine both ownership and operating costs from the contractor's accounting records. When both ownership and operating costs cannot be determined for any piece of equipment or groups of similar serial or series equipment from the contractor's accounting records, costs for that equipment shall be based upon the applicable provisions of EP 1110-1-8, "Construction Equipment Ownership and Operating Expense Schedule," Region III. Working conditions shall be considered to be average for determining equipment rates using the schedule unless specified otherwise by the contracting officer. For equipment not included in the schedule, rates for comparable pieces of equipment may be used or a rate may be developed using the formula provided in the schedule. For forward pricing, the schedule in effect at the time of negotiations shall apply. For retrospective pricing, the schedule in effect at the time the work was performed shall apply.

c. Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d)(ii) and FAR 31.205-36. Rates for equipment rented from an organization under common control, lease-purchase arrangements, and sale-leaseback arrangements will be determined using the schedule, except that actual rates will be used for equipment leased from an organization under common control that has an established practice of leasing the same or similar equipment to unaffiliated lessees.

d. When actual equipment costs are proposed and the total amount of the pricing action exceeds the small purchase threshold, the contracting officer shall request the contractor to submit either certified cost or pricing data, or partial/limited data, as appropriate. The data shall be submitted on Standard Form 1411, "Contract Pricing Proposal Cover Sheet."

1.34 CONTRACTOR MAINTENANCE

At the end of each working day the Contractor shall police the work area and the area immediately surrounding the work area of all work-related debris. The Contractor shall comply with all applicable safety requirements and shall conduct his operations in a manner to insure an accident-free environment. Contractor shall keep all grassed areas within his work area in a neatly trimmed state during the growing season. Stacked materials shall not be within 25 feet of an active roadway.

1.35 ELECTRICITY

All electric current required by the Contractor shall be furnished at his own expense. All temporary connections for electricity shall be subject to the approval of the Contracting Officer's representative. In the event electricity is made available by the Government the Contractor shall at his own expense, install a meter to determine the amount of current used by him and such electricity will be paid for by or charged to the Contractor at prevailing rates or at reasonable rates as determined by the Contracting Officer. All temporary lines will be furnished, installed, connected, and maintained by the Contractor in a workmanlike manner satisfactory to the
Contracting Officer, and shall be removed by the Contractor in like manner, at his expense, prior to completion of the construction.

1.36 EQUIPMENT LAYOUT DRAWINGS

The Contractor shall submit "layout drawings" in plan and necessary elevation, of all mechanical, electrical, heating, and ventilating equipment space(s) showing the proposed equipment, ductwork, piping, conduits, etc., with clearances, for approval of the Contracting Officer, whether or not such layout drawings are specified under the various technical sections of the specifications. In spaces having more than one type of equipment, the layout drawings shall indicate the composite arrangement of all types of equipment and all associated work with all clearances. The layouts of equipment and associated work shall provide adequate and acceptable clearances for entry, servicing, and maintenance. The submittal and approval of equipment layout drawings shall conform to the requirements as herein before specified for shop drawings. Should the Contractor propose to furnish any equipment or standard products requiring allocations of space, or electrical, mechanical, or piping connections thereto, or supports different from those shown or indicated on the plans or in the specifications, he shall prepare and submit full detail drawings to the Contracting Officer for approval showing all changes. The approved detailed drawings shall become a part of the contract and any changes in the construction resulting from revisions in the details and dimensions on the drawings which are required by the substitution of alternate equipment and/or products shall be made at the expense of the Contractor.

1.37 REQUIREMENTS FOR TEMPORARY CRANES

All cranes used by the Contractor for construction purposes will require written acceptance for their use by the Contracting Officer's representative. All requests shall be made seven (7) days in advance of the crane's arrival on the job site and shall include such information as total operating height, mode of transportation and delivery to the project site, period of use and methods of conforming to all safety and airfield operations procedures. Cranes operating at night shall require a red blinking light at the highest point on the crane boom which conforms to Federal Aviation Administration (FAA) requirements. When not in operation, crane booms shall be in the lowered position. Contractor is responsible for obtaining all necessary FAA Permits for erection of temporary structures.

1.38 SAFETY MARKINGS ON CRANE BOOMS

All cranes shall have a red strobe light and two flags attached to the end of the boom. The flags shall be 46 cm (18-inches) square and international orange in color. The strobe does not need to be flashing during daylight hours or when the boom is lowered to the ground at night. The strobe shall be flashing when operating during weather in which visibility is reduced or when operating at night. The strobe shall remain flashing if the boom remains elevated at night.

1.39 ELECTRONIC MAIL SYSTEM

The Contractor shall provide and maintain for the life of this contract an electronic mail system which shall interface, connect to and be compatible with the existing electronic mail system in the Corps of Engineers Resident Office. The Contractor's electronic mail system shall transfer and receive correspondence between the Resident Office without loss or modification of
formatting codes or special characters.

The Resident Office is currently utilizing Exchange/MS Outlook for Windows and is Internet accessible. The Corps Internet E-mail gateway accepts binary files in uuencoded format, with a limit of 6Mb per E-mail message. Internet messages may be sent to any Mobile District Corps of Engineers Employee using the form <First Name>.<Middle Initial>.<Last Name>@usace.army.mil without the brackets surrounding the names.

During construction, all Requests For Information (RFIs) including field sketched drawings shall be transmitted to the Corps of Engineers Resident Office in an electronic format. The RFIs shall be saved into a "pdf" format using Adobe Acrobat 4.0 software.

The Contractor's electronic mail system shall have the capability of sending and receiving text, graphic, and drawing files developed on the following software:

1) Microsoft Word
2) WordPerfect
3) AutoCad
4) Adobe Acrobat

The Contractor shall bear the responsibility to ensure total hardware and software compatibility with the Government's system when transferring and receiving information.

Within 10 days after receipt of NTP, the Contractor shall submit for approval an electronic mail system plan which details the hardware, software, communication paths, processes and procedures for establishing and maintaining the Contractor's electronic mail system.

1.40 SCHEDULED OUTAGES

a. All outages, including but not limited to communication, water, electricity, natural gas, sewage and road closures, shall be of as short in duration as possible and shall be scheduled by the Contractor in writing, as far in advance as possible with the Contracting Officer's representative. In no case shall roadway closure scheduling occur less than thirty (30) days prior to the required closure. In no case shall utility scheduling occur less than ten (10) days prior to the required outage.

1. The Contractor's outage request shall include the following:

a) Type of utility, access or service to be disrupted.

b) Areas and/or facilities affected.

c) Expected duration of outage.

d) Date of proposed outage.

e) Names of authorized personnel.

f) Point of contact and telephone numbers.

b. The Contractor shall obtain in writing from the Contracting Officer's representative a statement of schedule, giving the permissible
times of outages for particular installations or activities and the maximum
time allowed for each outage. Any utility outage expected to exceed one
(1) hour in duration shall be scheduled for the weekend (Saturday/Sunday)
and shall not exceed six (6) hours in duration. Any utility outage
scheduled during the week (Monday through Friday) shall not exceed one (1)
hour in duration. Scheduled outages during the week may be required to
occur before or after normal business hours. No outage shall occur until
written approval is received from the Contracting Officer’s
representative. The Contractor shall strictly observe such schedules and
will be held responsible for any violations. The Contractor shall include
with each outage request a list or bill of materials and equipment that
will be used during said outage. The Contractor will be solely responsible
for ensuring that all materials and equipment will be on hand and ready for
use during any scheduled outage.

1.41 ROAD CLOSURES

Planned road closures shall be detailed and coordinated by the Contractor.
Road closures shall be in accordance with the project's Construction
Phasing and Traffic Routing Plans. Requests for road closures shall be
submitted in writing by the Contractor to the Contracting Officer's
Representative no less than 30 days prior to the required closure. Request
for road closures shall be in accordance with paragraph "Scheduled Outages"
above. When it becomes necessary to close roads for construction, the
contractor shall immediately put in place the necessary signs and
barricades required. The signs and barricades used shall conform with the
National Transportation Safety Board (NTSB) standards. These include but
are not limited to begin/end construction signs, standard traffic control
signs including clearly marked detours and barricades with yellow flashing
cautions lights. Hand painted plywood signs (or other materials) are not
allowed or acceptable. Upon completion of road work, all signs and
barricades shall be immediately removed and all normal traffic control
deVICES and signs returned to their original condition. Signs and
barricades shall not be left along sides of roadways.

The Contractor shall submit a Construction Sequence Plan to the Contracting
Officer's Representative for approval prior to commencement of
construction. The Construction Sequence Plan shall identify proposed
sequence and durations of roadway closures.

The Contractor shall submit a Traffic Control and Signage Plan for each
phase of construction to the Contracting Officer's Representative no less
than 30 days prior to the required closure. The Traffic Control and
Signage Plans shall be in accordance with M.U.T.C.D. Standards, 2009

1.42 CONSTRUCTION/SITE MANAGEMENT STANDARDS

a. GENERAL

1) The following standards relate to the appearance of the construction
site during the construction cycle, temporary administrative and storage
areas, and service facilities needed for execution and completion of the
work.

2) Refer to Site Plans for information pertaining to the extents of the
landfill. Contractor shall notify the COR 14 days prior to any
construction activities in this area.
3) Contractors should screen grouped temporary facilities from the public view.

4) A visually acceptable site is an important construction standard. A clean, well-kept site will help ensure compliance with the safety and environmental requirements of the contract. Contractor's trailers and storage buildings shall follow the base paint standards. The contractor shall maintain the trailers or storage buildings in good condition or they shall be removed. The contractor is responsible for the security of his property and general housekeeping of the area(s).

5) Site Plan. Prior to starting the work, the Contractor shall submit site plans to the Contracting Officer's representative for approval showing the layout and details of all temporary facilities used for this contract. The Contracting Officer's representative shall coordinate the plans with the base approval authority. The plan shall include the location of:

   a) Safety and construction entrances
   b) Trash dumpsters
   c) Temporary sanitary facilities
   d) Worker parking areas
   e) Contractor, sheds and trailers,
   f) Contractor storage areas
   g) Staging areas
   h) Temporary utility tie-ins
   i) Contractor security fencing
   j) Project sign
   k) Telephone service and locations.

6) Site photographs prior to the start of work may be included with the plan. At completion of work, the contractor shall remove the facilities and restore the site to its original condition.

7) Dirt and Dust Control Plan: The Contractor shall submit truck and material haul routes along with a plan for controlling dirt, debris and dust on base roadways. As a minimum, the plan shall identify the subcontractor and equipment for cleaning along the haul route and measures to reduce dirt, dust, and debris from roadways.

   b. CONTRACTOR'S TEMPORARY FACILITIES

1) Administrative Field Offices and Material Storage Trailers: Contractor's administrative field office and storage trailers shall be in like new condition and the exterior shall match the base standard color. Locate the office and trailers behind the construction fence unless otherwise indicated on the drawings. Storage of materiel's/debris under the trailers is prohibited.

2) Material Storage Area:

   a) Supplemental Storage Area - This area is for storage of items not immediately required at the construction site. The location is indicated on the drawings. The Contractor is responsible for the security of the stored property and general housekeeping.

   b) Primary Storage Area - Site storage is limited to the material that is needed within one week. Enclose the storage area by a construction fence, as described later, unless otherwise indicated on the drawings.
c. Dumpsters. Equip dumpsters with a secure cover. Dumpsters shall be brown in color. The cover shall be closed at all times, except when being loaded with trash and debris. Locate dumpsters behind the construction fence or out of the public view. Empty site dumpsters at least once a week, or as needed to keep the site free of debris and trash. If necessary, provide 208 liter (55 gallon) trash containers at least once a day. Large demolition normally requires a large dumpster without lids. These dumpsters are acceptable but should not have debris higher than the sides before emptying.

d. Temporary Sanitation Facilities. All temporary sewer and sanitation facilities shall be self contained units with both urinals and stool capabilities. Ventilate the units to control odors and fumes and empty and clean them at least once a week or more often if required by the contracting officer. The doors should be self-closing. The exterior of the unit will match the base standard. Locate the facility behind the construction fence or out of the public view.

e. NOT USED.

f. GRASS CUTTING

Cut grass (or annual weeds) within the construction and storage sites to a 4-inch height at least once a week during the growing season unless the grass area is not visible to the public. Trim the grass around fences at time of grass cutting. Grass or weeds on stockpiled earth shall be maintained as described above.

1.43 COORDINATION CONFERENCES

Routine coordination conferences will be scheduled by the Contracting Officer's Representative throughout the life of this contract. Coordination conferences will be held to discuss contract administration, Contractor quality control, phasing, scheduling, and other aspects relating to this construction. The Using Agency, Corps of Engineers and the Contractor will be represented at each of these meetings. Similar information concerning replacement personnel shall be forwarded to the Contracting Officer's Representative, should any replacement be required at any time during the life of this contract. Coordination conferences will be scheduled to occur on a weekly basis. The Contractor shall develop the Meeting Minutes for each Coordination conference. A copy of the meeting minutes shall be provided to the Corps and all attendees via e-mail no later than three (3) working days after each meeting. The Contractor shall develop and maintain a list of action items that arise during construction or at each Coordination Conference. The Action Items list shall describe each Issue/Action Item and state what organization/person is tasked with its resolution. Blanks, or cells, shall be provided for dates when the Issue/Action Item was first raised, the due date for its resolution, and the date of actual resolution.

1.44 CONSTRUCTION PERMITS

Local permitting procedure is in effect for any work which may disrupt vehicular traffic flow, base utility services, building construction, facility renovations, routine activities of the installation or which may involve subsurface excavation, road construction or repair. Contractor must plan and detail any work of this nature sufficiently in advance of the proposed work. ERDC Form 114, Facility Engineering Work Clearance Request
must be submitted at least 10 (ten) working days in advance of the proposed performance date to the Contracting Officer's Representative. This form is required for each separate detached facility or structure. It is the responsibility of the contractor to coordinate the work request with the various agencies listed on ERDC Form 114. Work will not begin until approval has been granted. ERDC Form 114 is attached following this section.

1.45 HAZARD ANALYSIS

A Hazard Analysis Plan, as described in Section 1, Article 01.A.05 of the Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, latest edition, is required for this contract, and shall be submitted thirty (30) days after Notice To Proceed (NTP).

1.46 PROJECT SIGN

The Contractor shall furnish and install a project sign at the location designated by the Contracting Officer within 30 days after notice to proceed. The sign shall be constructed with a face sheet of 1/2-inch thick, grade A-C, exterior plywood mounted on a substantial framework of treated wood, sized and detailed as shown on Figure "Erection Details", bound herein. Lettering, color, and paint shall conform to the details shown in the "Construction Sign", bound herein. The sign shall receive one coat of primer paint followed by 2 coats of gloss exterior enamel. Lettering shall be with gloss exterior enamel. The appropriate emblems shall be provided by the Contractor, and shall be acquired through the Federal Industries (ENCOR), the Fort Leavenworth sign shop, or commercial sources. The Contractor shall coordinate emblem acquisition with the DPW. The Contractor shall maintain the sign in a "like new" condition throughout the life of the project, repainting and replacing members as necessary to accomplish this requirement. Upon completion of the work under this contract, the project sign shall be removed from the job site and shall remain the property of the Contractor. No direct payment will be made for the sign nor for maintenance of the sign.

1.47 CONSTRUCTION MATERIALS

All construction materials shall remain in the designated staging area until ready for use. Storage of materials in areas other that the designated area will not be allowed.

1.48 CONSTRUCTION DEBRIS DISPOSAL

All construction debris shall be disposed of as specified on the plans or at an approved disposal site off Government controlled lands.

1.49 DAMAGE TO EXISTING ROADWAYS

Prior to starting construction, the Contractor shall make a joint inspection of existing roads with the Contracting Officer's representative and document the condition of these roads in a report and a video tape. Damage to existing roads and curbs caused by Contractor equipment during construction shall be repaired by the Contractor at the conclusion of construction.

1.50 RADIO TRANSMISSIONS

To avoid conflict with transmission frequencies currently in use, the
Contractor shall submit a written request for use of each radio device to be used at the job site. The request shall contain: (1) a list of all radios to be used with serial number, (2) frequencies to be used, (3) power output, and (4) a copy of the FCC license for each device. The Contracting Officer's Representative reserves the right to order the Contractor not to use radios in times of sensitive base operations. The Contractor shall provide to the Contracting Officer's Representative a point of contact to be notified when all radio transmissions must cease due to sensitive base operations and when radio operations can resume. Radios shall not be used until the Contractor receives written approval from the Contracting Officer's Representative.

1.51  BURIED PIPING AND UTILITIES

The Contractor shall provide a tracer wire on the top of all non-metallic piping buried 150 mm (6-inches) below finished grade or deeper. The tracer wire shall be magnetic detectable conductor, brightly colored plastic covering, imprinted with the type of service in large letters. Marking of electrical conduits shall be as described in SECTION 16375 - Electrical Distribution System, Underground. Before utility Trench is backfilled, Contractor to contact DPW Personnel and allow at least two hours for DPW Personnel to mark the location of the newly installed conduit/piping using GPS.

1.52  BASE WATERING POLICY

The Contractor shall be required to maintain newly sodded areas until the grasses and landscaping are accepted by the COR. In fulfilling this requirement, the Contractor shall comply with the Base Watering policy which allows watering between the hours 0600 to 1000 hours and from 1800 to 2200 hours. The water must not be allowed to pond or run off the area. If sufficient water is available from a nearby ditch or other on-site source, the Contractor shall use a sump pump to irrigate.

1.53  ASBESTOS MATERIALS AND LEAD BASED PAINTS

The Contractor shall not use materials containing Asbestos or Lead Based Paints in the construction of this facility.

Upon completion of the construction, the Contractor shall submit two copies of a Certified Letter to the Contracting Officer's Representative (COR) stating that no lead based paints or materials containing asbestos were used in the construction of the new facilities. One copy of the letter will be filed with project documents in the Resident Engineer's Office. The COR will deliver the remaining copy to the Base Environmental Office.

1.54  SUBMISSION OF FINAL DD FORM 1354 - TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY

Using the blank DD Form 1354 provided at the end of this section and the Interim DD Form 1354 obtained from the Contracting Officer's Representative, the Contractor shall submit the Final DD Form 1354 for the project no later than fourteen (14) days prior to the Beneficial Occupancy Date (BOD). Category Code numbers found on the DD Form 1354 Checklist provided at the end of this section shall be used in completing the Final DD Form 1354.
1.55 RATES OF WAGES

Wage rates follow at the end of this section.

1.56 ANTITERRORISM AND OPERATIONS SECURITY (AT/OPSEC) REQUIREMENTS

1.56.1 Access and General Protection/Security Policy and Procedures

All contractor and all associated sub-contractors employees shall comply with applicable installation, facility and area commander installation/facility access and local security policies and procedures (provided by government representative). The contractor shall also provide all information required for background checks to meet installation/facility access requirements to be accomplished by installation Provost Marshal Office, Director of Emergency Services or Security Office. Contractor workforce must comply with all personal identity verification requirements (FAR clause 52.204-9, Personal Identity Verification of Contractor Personnel) as directed by DOD, HQDA and/or local policy. In addition to the changes otherwise authorized by the changes clause of this contract, should the Force Protection Condition (FPCON) at any installation or facility change, the Government may require changes in contractor security matters or processes.

1.56.2 For contractors who do not require CAC, but require access to a DoD facility or installation

Contractor and all associated sub-contractors employees shall comply with adjudication standards and procedures using the National Crime Information Center Interstate Identification Index (NCIC-III) and Terrorist Screening Database (TSDB) (Army Directive 2014-05 / AR 190-13), applicable installation, facility and area commander installation/facility access and local security policies and procedures (provided by government representative, as NCIC and TSDB are available), or, at OCONUS locations, in accordance with status of forces agreements and other theater regulations.

1.56.3 Pre-screen candidates using E-Verify Program

The Contractor must pre-screen Candidates using the E-verify Program (http://www.uscis.gov/e-verify) website to meet the established employment eligibility requirements. The Vendor must ensure that the Candidate has two valid forms of Government issued identification prior to enrollment to ensure the correct information is entered into the E-verify system. An initial list of verified/eligible Candidates must be provided to the COR no later than 3 business days after the initial contract award.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

-- End of Section --
The graphic format for this 4' x 6' sign panel follows the legend guidelines and layout as specified below. The large 4' x 4' section of panel on the right is to be white with black legend. The 2' x 4' section of the sign on the left with the full Corps signature (reverse version) is to be screen printed Communications Red on the White background.

This sign is to be placed with the Safety Performance Sign (See Fig. 5d).

Legend Group 1: One to two-line description of Corps relationship to project
Color: White
Typeface: 1.25" Helvetica Regular
Maximum line length: 19"

Legend Group 2: Division District Name Placed below 10.5" Reverse Signature (6" Castle).
Color: White
Typeface: 1.25" Helvetica Regular

Legend Group 3: One- to three-line project title legend describes the work being done under this contract.
Color: Black
Typeface: 3" Helvetica Bold
Maximum line length: 42"

Legend Group 4: One- to two-line identification of project or facility (civil works) or name of sponsoring department (military).
Color: Black
Typeface: 1.5" Helvetica Regular
Maximum line length: 42"
Cross-align the first line of Legend Group 4 with the first line of the Corps Signature (US Army Corps) as shown.

Legend Groups 5a-b: One- to five-line identification of prime contractors including: type (architect, general contractor, etc.), corporate or firm name, city, state. Use of Legend Group 5 is optional.
Color: Black
Typeface: 1.25" Helvetica Regular
Maximum line length: 21"

All typography is flush left and rag right, upper and lower case with initial capitals only as shown. Letter- and word-spacing to follow Corps standards.

<table>
<thead>
<tr>
<th>Sign Type</th>
<th>Legend Size</th>
<th>Panel Size</th>
<th>Post Size</th>
<th>Specification Code</th>
<th>Mounting Height</th>
<th>Color Bkg/Lgd</th>
</tr>
</thead>
<tbody>
<tr>
<td>CID-01</td>
<td>Various</td>
<td>4' x 6'</td>
<td>4' x 4'</td>
<td>HDO-3</td>
<td>48&quot;</td>
<td>WH-RD/BK</td>
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<table>
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<tr>
<th>Design and Construction Supervised by</th>
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<tbody>
<tr>
<td>US Army Corps of Engineers</td>
</tr>
<tr>
<td>South Atlantic Division</td>
</tr>
<tr>
<td>Mobile District</td>
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</tbody>
</table>

Name of Project
Location: City and State

Design By: US Army Corps of Engineers Mobile District
Contractor: Name City and State

Fig. 5a
All Construction Project Identification signs and Safety Performance signs are to be fabricated and installed as described below. The signs are to be erected at a location designated by the contracting officer and shall conform to size, format, and typographic standards.

The sign panels are to be fabricated from .75” High Density Overlay Plywood.

Sign graphics to be prepared on a white non-reflective vinyl film with positionable adhesive backing.

All graphics except for the Communications Red background with Corps signature on the project sign are to die-cut or computer cut non-reflective vinyl, pre-spaced legends prepared in the sizes and typefaces specified and applied to the background panel following the graphic formats shown.

The 2’ x 4’ Communications Red panel (to match PMS-032) with full Corps signature (reverse version) is to be screen printed on the white background identification of the District / Division may be applied under the signature with white cut vinyl letters prepared to Corps standards.

Drill and insert six (6) .375 T-nuts from the front face of the HDO sign panel. Position holes as shown. Flange of T-nut to be flush with sign face.

Apply Graphic panel to prepared HDO plywood panel following manufacturers instructions.

Sign uprights to be structural grade 4” x 4” treated Douglas Fur or Southern Yellow Pine. No 1 or better. Post to be 12’ long. Drill six (6) .375” mounting holes in uprights to align with T-nuts in sign panel. Countersink (5”) back of hole to accept socket head cap screw (4” x .375”).

Assemble sign panel and uprights. Imbed assembled sign panel and uprights in 4’ hole. Local soil conditions and/or wind loading may require bolting additional 2” x 4” struts on inside face of uprights to reinforce installation shown.

Shown below the mounting diagram is a panel layout grid with spaces provided for project information. Photocopy this page and use as a worksheet when preparing sign Legend orders.

**Construction Project Sign**
Legend Group 1
1 __________________________
2 __________________________

Legend Group 2: Division/District Names
1 __________________________
2 __________________________

Legend Group 3: Project Title
1 __________________________
2 __________________________
3 __________________________

Legend Group 4: Facility Name
1 __________________________
2 __________________________

Legend Group 5a: Contractor/A&E
1 __________________________
2 __________________________
3 __________________________
4 __________________________
5 __________________________

Legend Group 5b: Contractor/A&E
1 __________________________
2 __________________________
3 __________________________
4 __________________________
5 __________________________

**Safety Performance Sign**
Legend Group 1: Project Title
1 __________________________
2 __________________________

Legend Group 2: Contractor/A&E
1 __________________________
2 __________________________

**FABRICATION AND MOUNTING GUIDELINES**

fig5c
Each contractor's safety record is to be posted on Corps managed or supervised construction projects and mounted with the construction project identification sign.

The graphic format, color, size, and typefaces used on the sign are to be reproduced exactly as specified below. The title with First Aid logo in the top section of the sign and the performance record captions are standard for all signs of the type. Legend Groups 2 and 3 below identify the project and the contractor and are to be placed on the sign as shown.

Safety record numbers are mounted on individual metal plates and are screw-mounted to the background to allow for daily revisions to posted safety performance record.

Legend Group 1: Standard two-line title
"Safety is a Job Requirement" with 8 oz.
Safety Green First Aid logo
Color: to match PMS 347
Typeface: 3" Helvetica Bold
Color: Black

Legend Group 2: One to two-line project title legend describes the work being done under this contract and name of host project.
Color: Black
Typeface: 1.5" Helvetica Regular
Maximum line length: 42"

Legend Group 3: One to two-line identification: name of prime contractor and city, state, address.
Color: Black
Typeface: 1.5" Helvetica Regular
Maximum line length: 42"

Legend Group 4: Standard safety record captions as shown.
Color: Black
Typeface: 12.5" Helvetica Reguler

Replaceable numbers are to be mounted on white .060 aluminum plates and screw-mounted to background.
Color: Black
Typeface: 3" Helvetica Regular
Plate size: 2.5" x .5"

All typography is flush left and rag right. Upper and lower case with initial capitals only as shown. Letter- and word-spacing to follow Corps standards.
This page was intentionally left blank for duplex printing.
### FACILITY ENGINEERING WORK CLEARANCE REQUEST

The proponent agency is CEERD-PW. (See Instructions on Reverse)

1. Clearance is requested to proceed with work at
   Work Order No. ____________________________ Contract No. ____________________________ involving excavation or utility disturbance per attached sketch. This area □ has □ has not been staked or clearly marked.

2. **TYPE OF FACILITY/WORK INVOLVED**
   - □ A. PAVEMENTS
   - □ B. DRAINAGE SYSTEMS
   - □ C. SECURITY
   - □ D. FIRE DETECTION & PROTECTION SYSTEMS
   - □ E. UTILITY
   - □ F. COMM
   - □ G. VEHICULAR TRAFFIC FLOW
   - □ OVERHEAD
   - □ UNDERGROUND
   - □ H. OTHER

3. **DATE CLEARANCE REQUIRED**

4. **DATE OF CLEARANCE**

5. **TELEPHONE NO.**

6. **ORGANIZATION**

7. **SIGNATURE OF REQUESTING OFFICIAL**

8. **ORGANIZATION**
   - □ A. ELECTRICAL DISTRIBUTION
   - □ B. MECHANICAL/HVAC
   - □ C. WATER DISTRIBUTION
   - □ D. DISTRIBUTION NATURAL GAS
   - □ E. STRUCTURAL
   - □ F. PAVEMENTS/GROUNDS
   - □ G. MASTER PLANNING
   - □ H. MAINTENANCE CONTRACT (COR)
   - □ I. OTHER (Specify)

9. **SECURITY/FIRE**

10. **SAFETY/ENVIRONMENTAL**

11. **COMMUNICATIONS - NON-ACE-IT**

12. **ACE-IT**

13. **COMMERCIAL UTILITY COMPANY**
   - □ TELEPHONE
   - □ GAS
   - □ ELECTRIC

14. **OTHER (Specify)**

15. **FACILITY ENGINEER**

16. **REQUESTED CLEARANCE**
   - □ APPROVED
   - □ DISAPPROVED

17. **TYPED NAME OF APPROVING OFFICER**
   - (Director, Directorate of Public Works)

18. **DATE**

19. **SIGNATURE OF APPROVING OFFICER**

---

**ERDC FORM 114, SEP 2014**
INSTRUCTIONS

The FE work clearance request is used for any work (contract or in-house) that may disrupt vehicular traffic flow, base utility services, protection provided by fire and intrusion alarm system, or routine activities of the installation. This form is used to coordinate the required work with key facility activities and keep customer inconvenience to a minimum. It is also used to identify potentially hazardous work conditions in an attempt to prevent accidents. The work clearance request is processed just prior to the start of work. If delays are encountered and the conditions at the job site change (or may have changed) this work clearance request must be reprocessed.

20. REMARKS. (This section must describe specific precautionary measures to be taken before and during work accomplishment. Specific comments concerning the approved method of excavation, hand or powered equipment, should be included.)
## Transfer and Acceptance of DoD Real Property

The public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to the Department of Defense, Washington Headquarters Services, Executive Services Directorate, Information Management Division, 4850 Mark Center Drive, Alexandria, VA 22350-3142 (0704-0188). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

### 1. From (Organization Name)

<table>
<thead>
<tr>
<th>1. FROM (Organization Name)</th>
<th>2. DATE PREPARED (YYYY/MM/DD)</th>
<th>3. PROJECT/JOB NUMBER</th>
<th>4. SERIAL NUMBER</th>
<th>5. TO (Organization - Installation Code and Name)</th>
<th>6. RPSUID/SITENAME/INSTCODE/INSTNAME</th>
<th>7. CONTRACT NUMBER(S)</th>
<th>7a. PLACED-IN-SERVICE DATE (YYYY/MM/DD)</th>
<th>8. TRANSACTION DETAILS</th>
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### 9. Item No.

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### 13. Other

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</table>

### 24. Statement of Completion

The facilities listed hereon are in accordance with maps, drawings, and specifications and change orders approved by the authorized representative of the using agency except for the deficiencies listed on the reverse side.

a. TRANSFERRED BY (Typed Name and Signature)

b. DATE SIGNED (YYYY/MM/DD)

c. TITLE (Area Engr./Base Engr./DPW/Construction Agent)

d. ACCEPTED BY (Typed Name and Signature)

e. DATE SIGNED (YYYY/MM/DD)

25a. Accepted by (Typed Name and Signature)

b. DATE SIGNED (YYYY/MM/DD)

c. TITLE (DPWRPAO)

26. PROPERTY VOUCHER NUMBER

DD FORM 1354, APR 2013

PREVIOUS EDITION IS OBSOLETE.
### INSTRUCTIONS

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

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

For detailed instructions on how to fill out this form, please refer to Unified Facilities Criteria (UFC) 1-300-08, dated 16 April 2008 or later.

**SPECIFIC DATA ITEMS.**

1. **From.** Name of the transferring agency.

2. **Date Prepared.** Date of actual preparation. Enter all dates in YYYYMMDD format (Example: March 31, 2010 = 20100331).

3. **Project/Job Number.** Project number on a DD Form 1391 or Individual Job Order Number.

4. **Serial Number.** Sequential serial number assigned by the preparing organization (e.g., 2010-0001).

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

6. **RPSUID/SITENAME/INSTCODE/INSTNAME.** Site Unique Identifier and name or installation code and name where the constructed facility is located.

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

7a. **Placed-In-Service Date.** RPA Placed In Service Date. This is the date the asset is actually placed-in-service.

8. **Transaction Details.**
   - a. Method of Transaction. Mark X as many boxes as apply.
   - b. When/Event. When or event causing preparation of DD Form 1354. X only one box.
   - c. Type. Draft, interim, or final DD Form 1354. X only one box.

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

10a. **Facility Number.** Assigned in accordance with the Installation/Base Master Numbering Plan.

10b. **RPUI.** Identified in Real Property Inventory.

11. **Category Code.** The category code describes the facility usage.

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

13. **Type.** Type of construction: P for Permanent; S for Semi-permanent; T for Temporary.

14. **Sustainability Code.** Reports whether or not an asset meets the sustainability goals set forth in Section 2(f)(l) of Executive Order 13423.

15. **Area: UM 1.** Area unit of measure; use the unit of measure associated with the category code selected in Item 11.

16. **Total Quantity UM 1.** The total area for the measure identified in Item 14. Use negative numbers for demolition.

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

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

19. **Cost.** Cost for each facility; for capital improvements to existing facilities, show amount of increase only. If there is no increase for the capital improvement, enter N/A.

20. **Fund Source.** Enter the Fund Source Code for this item.

21. **Funding Organization.** Enter the code for the organization responsible for acquiring this facility.

22. **Interest Code.** Enter the code that reflects government interest or ownership in the facility.

23. **Item Remarks.** Remarks pertaining only to the item number identified in Item 9; show cost sharing.

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

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

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

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

28. **Project Remarks.** Project level remarks and continuation of blocks.
The Contractor is required, prior to the Final Inspection, to submit a completed copy of the following Construction Data Worksheet (CDS) along with an As-Built copy of the building floorplan(s). The CDS is used by the Air Force to inventory and capitalize new work. The Construction Representative will review the CDS, ensure that it is complete, and forward it to the Real Estate Office within 15 working days of the Final Inspection. This checklist includes only the basic general construction category codes. More detailed category code listing information is available through the Real Property Office, 884-6860.

I. TITLE OF PROJECT: __________________________________________________________

II. GENERAL DATA: (for construction to existing facilities, only provide data for the new addition).

A. Outside Dimensions:
   - Main Buildings _______________________
   - Wings _______________________
   - Offsets _______________________
   - Total SF _______________________

B. Number of Floors: _______________________

C. Construction Material:
   - Foundation _______________________
   - Floors _______________________
   - Outside Walls _______________________
   - Roof _______________________

III. UTILITIES/RELATED FACILITIES - Addition

<table>
<thead>
<tr>
<th>Cat Code</th>
<th>Nomenclature</th>
<th>UM</th>
<th>Amount</th>
<th>Cost</th>
<th>Descript</th>
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</thead>
<tbody>
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<td>Pad, Equip</td>
<td>EA</td>
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<td>132-134</td>
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<td>135-583</td>
<td>Tel Duct Facility</td>
<td>LF</td>
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<td>Tel Pole Facility</td>
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<td>Transformers</td>
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<td>812-224</td>
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<td>Sanitary Sewer Pump Station</td>
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<td>843-314</td>
<td>Fire Protection Water Main</td>
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<td>851-143</td>
<td>Curbs &amp; Gutters</td>
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<td>851-145</td>
<td>Driveway (type material - concrete, asphalt, other) (Trans. betw Road &amp; Parking Lot)</td>
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<td>851-147</td>
<td>Road (type material - concrete, asphalt, other)</td>
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<td>871-183</td>
<td>Storm Drain Disposal</td>
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<td>872-245</td>
<td>Fence Boundary</td>
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<td>Fence Security</td>
<td>LF</td>
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<td>872-248</td>
<td>Fence Interior</td>
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IV. SYSTEMS - Addition

890-269 Cathodic Protection System EA

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<td>880-212</td>
<td>Open Head Deluge System</td>
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<td>Auto Fire Detection System</td>
<td>SF</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>880-222</td>
<td>Manual Fire Alarm System (Int)</td>
<td>EA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>880-223</td>
<td>Manual Fire Alarm System (Ext)</td>
<td>BX</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>880-232</td>
<td>Foam Fire System</td>
<td>EA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>880-233</td>
<td>Other Fire System</td>
<td>EA</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
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B. SECURITY SYSTEM:

<table>
<thead>
<tr>
<th>Cat Code</th>
<th>Nomenclature</th>
<th>UM</th>
<th>Amount</th>
<th>Cost</th>
<th>Descript</th>
</tr>
</thead>
<tbody>
<tr>
<td>872-841</td>
<td>Security Alarm System</td>
<td>EA</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C. ENERGY MONITORING AND CONTROL SYSTEM:
### V. PLANTS:

<table>
<thead>
<tr>
<th>Cat Code</th>
<th>Nomenclature</th>
<th>UM</th>
<th>Amount</th>
<th>Cost</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>811-147</td>
<td>Electric Emergency Power</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Generator</td>
<td>KW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Storage Tank for Heating</td>
<td>GA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Or Generator Fuel (Type Fuel)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Storage Tank for Heating</td>
<td>GA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>821-113</td>
<td>Htg Fir Cen Pit</td>
<td>MB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>821-115</td>
<td>Heating Plt 750/3500 MB</td>
<td>MB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>821-116</td>
<td>Heating Plt over 3500 MB</td>
<td>MB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Storage Tank for Heating</td>
<td>GA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>890-121</td>
<td>A/C Pit 5 to 25 TN</td>
<td>TN</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>826-122</td>
<td>A/C Pit 25 to 100 TN</td>
<td>TN</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>826-123</td>
<td>A/C Pit Over 100 TN</td>
<td>TN</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>890-125</td>
<td>A/C Pit less than 5 TN</td>
<td>TN</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>890-126</td>
<td>A/C Window Units</td>
<td>TN</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### VI. DEMOLITION COSTS:

$_______

### VII. NARRATIVE

(Provide a brief narrative of what was accomplished, including items removed - A/C Units, Fire Suppression Systems, Roads, Sidewalks, etc.)

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

**TOTAL COST OF PROJECT**

$_______

I certify that the information provided is complete and accurate to the best of my knowledge.

___________________________________  _____________________________________
CONTRACTOR                                CONTRACTING OFFICER'S REPRESENTATIVE

__________________________________  _____________________________________
DATE                                      DATE
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General Decision Number: MS180135 07/06/2018  MS135

Superseded General Decision Number: MS20170135

State: Mississippi

Construction Type: Building
BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).


Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.35 for calendar year 2018 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.35 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2018. The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number     Publication Date
0              01/05/2018
1              01/26/2018
2              07/06/2018

* ELEC0480-011 07/01/2018

Rates          Fringes
ELECTRICIAN...............$ 25.10             9.13
SUMS2015-005 04/03/2017

Rates          Fringes
CARPENTER...............$ 16.10             0.00
CEMENT MASON/CONCRETE FINISHER...$ 20.00             0.00
IRONWORKER, STRUCTURAL...........$ 24.05            12.29
<table>
<thead>
<tr>
<th>Classification</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LABORER: Common or General</td>
<td>$10.76</td>
</tr>
<tr>
<td>LABORER: Mason Tender - Cement/Concrete</td>
<td>$12.98</td>
</tr>
<tr>
<td>LABORER: Pipelayer</td>
<td>$12.52</td>
</tr>
<tr>
<td>OPERATOR: Backhoe/Excavator/Trackhoe</td>
<td>$18.00</td>
</tr>
<tr>
<td>PAINTER (Brush and Roller)</td>
<td>$15.17</td>
</tr>
<tr>
<td>PIPEFITTER</td>
<td>$22.77</td>
</tr>
<tr>
<td>PLUMBER</td>
<td>$20.00</td>
</tr>
<tr>
<td>SHEET METAL WORKER, Includes HVAC Duct Installation</td>
<td>$19.67</td>
</tr>
<tr>
<td>TRUCK DRIVER: Dump Truck</td>
<td>$13.50</td>
</tr>
</tbody>
</table>

**WELDERS** - Receive rate prescribed for craft performing operation to which welding is incidental.

---

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

---

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination.
determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.
A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

----------------------------------------------------------------

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:
Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

================================================================

END OF GENERAL DECISION
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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.

AACE INTERNATIONAL (AACE)

AACE 29R-03 (2011) Forensic Schedule Analysis

U.S. ARMY CORPS OF ENGINEERS (USACE)


1.2 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. Submittals with an "S" are for inclusion in the Sustainability Notebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals
Project Scheduler Qualifications; G
Preliminary Project Schedule; G
Initial Project Schedule; G
Periodic Schedule Update; G

1.3 PROJECT SCHEDULER QUALIFICATIONS

Designate an authorized representative to be responsible for the preparation of the schedule and all required updating and production of reports. The authorized representative must have a minimum of 2-years experience scheduling construction projects similar in size and nature to this project with scheduling software that meets the requirements of this specification. Representative must have a comprehensive knowledge of CPM scheduling principles and application.

PART 2   PRODUCTS

2.1 SOFTWARE

The scheduling software utilized to produce and update the schedules
required herein must be capable of meeting all requirements of this specification.

2.1.1 Government Default Software

The Government intends to use Primavera P6.

2.1.2 Contractor Software

Scheduling software used by the contractor must be commercially available from the software vendor for purchase with vendor software support agreements available. The software routine used to create the required sdef file must be created and supported by the software manufacturer.

2.1.2.1 Primavera

If Primavera P6 is selected for use, provide the "xer" export file in a version of P6 importable by the Government system.

2.1.2.2 Other Than Primavera

If the contractor chooses software other than Primavera P6, that is compliant with this specification, provide for the Government's use two licenses, two computers, and training for two Government employees in the use of the software. These computers will be stand-alone and not connected to Government network. Computers and licenses will be returned at project completion.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Prepare for approval a Project Schedule, as specified herein, pursuant to FAR Clause 52.236-15, SCHEDULE FOR CONSTRUCTION CONTRACTS. Show in the schedule the proposed sequence to perform the work and dates contemplated for starting and completing all schedule activities. The scheduling of the entire project is required. The scheduling of construction is the responsibility of the Contractor. Contractor management personnel must actively participate in its development. Subcontractors and suppliers working on the project must also contribute in developing and maintaining an accurate Project Schedule. Provide a schedule that is a forward planning as well as a project monitoring tool. Use the Critical Path Method (CPM) of network calculation to generate all Project Schedules. Prepare each Project Schedule using the Precedence Diagram Method (PDM).

3.2 BASIS FOR PAYMENT AND COST LOADING

The schedule is the basis for determining contract earnings during each update period and therefore the amount of each progress payment. The aggregate value of all activities coded to a contract CLIN must equal the value of the CLIN.

3.2.1 Activity Cost Loading

Activity cost loading must be reasonable and without front-end loading. Provide additional documentation to demonstrate reasonableness if requested by the Contracting Officer.
3.2.2 Withholdings / Payment Rejection

Failure to meet the requirements of this specification may result in the disapproval of the preliminary, initial or periodic schedule updates and subsequent rejection of payment requests until compliance is met.

In the event that the Contracting Officer directs schedule revisions and those revisions have not been included in subsequent Project Schedule revisions or updates, the Contracting Officer may withhold 10 percent of pay request amount from each payment period until such revisions to the project schedule have been made.

3.3 PROJECT SCHEDULE DETAILED REQUIREMENTS

3.3.1 Level of Detail Required

Develop the Project Schedule to the appropriate level of detail to address major milestones and to allow for satisfactory project planning and execution. Failure to develop the Project Schedule to an appropriate level of detail will result in its disapproval. The Contracting Officer will consider, but is not limited to, the following characteristics and requirements to determine appropriate level of detail:

3.3.2 Activity Durations

Reasonable activity durations are those that allow the progress of ongoing activities to be accurately determined between update periods. Less than 2 percent of all non-procurement activities may have Original Durations (OD) greater than 20 work days or 30 calendar days.

3.3.3 Procurement Activities

Include activities associated with the critical submittals and their approvals, procurement, fabrication, and delivery of long lead materials, equipment, fabricated assemblies, and supplies. Long lead procurement activities are those with an anticipated procurement sequence of over 90 calendar days.

3.3.4 Mandatory Tasks

Include the following activities/tasks in the initial project schedule and all updates.

a. Submission, review and acceptance of SD-01 Preconstruction Submittals (individual activity for each).

b. Submission, review and acceptance of features require design completion

c. Submission of mechanical/electrical/information systems layout drawings.

d. Long procurement activities

e. Submission and approval of O & M manuals.

f. Submission and approval of as-built drawings.

g. Submission and approval of DD1354 data and installed equipment lists.
h. Submission and approval of testing and air balance (TAB).

i. Submission of TAB specialist design review report.

j. Submission and approval of fire protection specialist.

k. Submission and approval of Building Commissioning Plan, test data, and reports: Develop the schedule logic associated with testing and commissioning of mechanical systems to a level of detail consistent with the contract commissioning requirements. All tasks associated with all building testing and commissioning will be completed prior to submission of building commissioning report and subsequent contract completion.

l. Air and water balancing.

m. Building commissioning - Functional Performance Testing.

n. Controls testing plan submission.

o. Controls testing.

p. Performance Verification testing.

q. Other systems testing, if required.

r. Contractor's pre-final inspection.

s. Correction of punch list from Contractor's pre-final inspection.

t. Government's pre-final inspection.

u. Correction of punch list from Government's pre-final inspection.

v. Final inspection.

3.3.5 Government Activities

Show Government and other agency activities that could impact progress. These activities include, but are not limited to: approvals, environmental permit approvals by State regulators, inspections, utility tie-in, Government Furnished Equipment (GFE) and Notice to Proceed (NTP) for phasing requirements.

3.3.6 Standard Activity Coding Dictionary

Use the activity coding structure defined in the Standard Data Exchange Format (SDEF) in ER 1-1-11. This exact structure is mandatory. Develop and assign all Activity Codes to activities as detailed herein. A template SDEF compatible schedule backup file is available on the QCS web site: http://rms.usace.army.mil.

The SDEF format is as follows:

<table>
<thead>
<tr>
<th>Field</th>
<th>Activity Code</th>
<th>Length</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WRKP</td>
<td>3</td>
<td>Workers per day</td>
</tr>
</tbody>
</table>
3.3.6.1 Workers Per Day (WRKP)

Assign Workers per Day for all field construction or direct work activities, if directed by the Contracting Officer. Workers per day is based on the average number of workers expected each day to perform a task for the duration of that activity.

3.3.6.2 Responsible Party Coding (RESP)

Assign responsibility code for all activities to the Prime Contractor, Subcontractor(s) or Government agency(ies) responsible for performing the activity.

a. Activities coded with a Government Responsibility code include, but are not limited to: Government approvals, Government design reviews, environmental permit approvals by State regulators, Government Furnished Property/Equipment (GFP) and Notice to Proceed (NTP) for phasing requirements.

b. Activities cannot have more than one Responsibility Code. Examples of acceptable activity code values are: DOR (for the designer of record); ELEC (for the electrical subcontractor); MECH (for the mechanical subcontractor); and GOVT (for USACE).

3.3.6.3 Area of Work Coding (AREA)

Assign Work Area code to activities based upon the work area in which the activity occurs. Define work areas based on resource constraints or space constraints that would preclude a resource, such as a particular trade or craft work crew from working in more than one work area at a time due to restraints on resources or space. Examples of Work Area Coding include different areas within a floor of a building, different floors within a building, and different buildings within a complex of buildings. Activities cannot have more than one Work Area Code.
Not all activities are required to be Work Area coded. A lack of Work Area coding indicates the activity is not resource or space constrained.

3.3.6.4 Modification Number (MODF)

Assign a Modification Number Code to any activity or sequence of activities added to the schedule as a result of a Contract Modification, when approved by Contracting Officer. Key all Code values to the Government's modification numbering system. An activity can have only one Modification Number Code.

3.3.6.5 Bid Item Coding (BIDI)

Assign a Bid Item Code to all activities using the Contract Line Item Schedule (CLIN) to which the activity belongs, even when an activity is not cost loaded. An activity can have only one BIDI Code.

3.3.6.6 Phase of Work Coding (PHAS)

Assign Phase of Work Code to all activities. Examples of phase of work are procurement phase and construction phase. Each activity can have only one Phase of Work code.

a. Code proposed fast track design and construction phases proposed to allow filtering and organizing the schedule by fast track design and construction packages.

b. If the contract specifies phasing with separately defined performance periods, identify a Phase Code to allow filtering and organizing the schedule accordingly.

3.3.6.7 Category of Work Coding (CATW)

Assign a Category of Work Code to all activities. Category of Work Codes include, but are not limited to construction submittal, procurement, fabrication, weather sensitive installation, non-weather sensitive installation, start-up, and testing activities. Each activity can have no more than one Category of Work Code.

3.3.6.8 Feature of Work Coding (FOW)

Assign a Feature of Work Code to appropriate activities based on the Definable Feature of Work to which the activity belongs based on the approved QC plan.

Definable Feature of Work is defined in Section 01 45 00.00 10 QUALITY CONTROL. An activity can have only one Feature of Work Code.

3.3.7 Contract Milestones and Constraints

Milestone activities are to be used for significant project events including, but not limited to, project phasing, project start and end activities, or interim completion dates. The use of artificial float constraints such as "zero free float" or "zero total float" are prohibited.

Mandatory constraints that ignore or effect network logic are prohibited. No constrained dates are allowed in the schedule other than those specified herein. Submit additional constraints to the Contracting Officer for
approval on a case by case basis.

3.3.7.1 Project Start Date Milestone and Constraint

The first activity in the project schedule must be a start milestone titled "NTP Acknowledged," which must have a "Start On" constraint date equal to the date that the NTP is acknowledged.

3.3.7.2 End Project Finish Milestone and Constraint

The last activity in the schedule must be a finish milestone titled "End Project."

Constrain the project schedule to the Contract Completion Date in such a way that if the schedule calculates an early finish, then the float calculation for "End Project" milestone reflects positive float on the longest path. If the project schedule calculates a late finish, then the "End Project" milestone float calculation reflects negative float on the longest path. The Government is under no obligation to accelerate Government activities to support a Contractor's early completion.

3.3.7.3 Interim Completion Dates and Constraints

Constrain contractually specified interim completion dates to show negative float when the calculated late finish date of the last activity in that phase is later than the specified interim completion date.

3.3.7.3.1 Start Phase

Use a start milestone as the first activity for a project phase. Call the start milestone "Start Phase X" where "X" refers to the phase of work.

3.3.7.3.2 End Phase

Use a finish milestone as the last activity for a project phase. Call the finish milestone "End Phase X" where "X" refers to the phase of work.

3.3.8 Calendars

Schedule activities on a Calendar to which the activity logically belongs. Develop calendars to accommodate any contract defined work period such as a 7-day calendar for Government Acceptance activities, concrete cure times, etc. Develop the default Calendar to match the physical work plan with non-work periods identified including weekends and holidays. Develop Seasonal Calendar(s) and assign to seasonally affected activities as applicable.

If an activity is weather sensitive it should be assigned to a calendar showing non-work days on a monthly basis, with the non-work days selected at random across the weeks of the calendar, using the anticipated days provided in the contract clause TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER. Assign non-work days over a seven-day week as weather records are compiled on seven-day weeks, which may cause some of the weather related non-work days to fall on weekends.

3.3.9 Open Ended Logic

Only two open ended activities are allowed: the first activity "NTP Acknowledged" may have no predecessor logic, and the last activity -"End
Project" may have no successor logic.

Predecessor open ended logic may be allowed in a time impact analyses upon the Contracting Officer's approval.

3.3.10 Default Progress Data Disallowed

Actual Start and Finish dates must not automatically update with default mechanisms included in the scheduling software. Updating of the percent complete and the remaining duration of any activity must be independent functions. Disable program features that calculate one of these parameters from the other. Activity Actual Start (AS) and Actual Finish (AF) dates assigned during the updating process must match those dates provided in the Contractor Quality Control Reports. Failure to document the AS and AF dates in the Daily Quality Control report will result in disapproval of the Contractor's schedule.

3.3.11 Out-of-Sequence Progress

Activities that have progressed before all preceding logic has been satisfied (Out-of-Sequence Progress) will be allowed only on a case-by-case basis subject to approval by the Contracting Officer. Propose logic corrections to eliminate out of sequence progress or justify not changing the sequencing for approval prior to submitting an updated project schedule. Address out of sequence progress or logic changes in the Narrative Report and in the periodic schedule update meetings.

3.3.12 Added and Deleted Activities

Do not delete activities from the project schedule or add new activities to the schedule without approval from the Contracting Officer. Activity ID and description changes are considered new activities and cannot be changed without Contracting Officer approval.

3.3.13 Original Durations

Activity Original Durations (OD) must be reasonable to perform the work item. OD changes are prohibited unless justification is provided and approved by the Contracting Officer.

3.3.14 Leads, Lags, and Start to Finish Relationships

Lags must be reasonable as determined by the Government and not used in place of realistic original durations, must not be in place to artificially absorb float, or to replace proper schedule logic.

a. Leads (negative lags) are prohibited.

b. Start to Finish (SF) relationships are prohibited.

3.3.15 Retained Logic

Schedule calculations must retain the logic between predecessors and successors ("retained logic" mode) even when the successor activity(s) starts and the predecessor activity(s) has not finished (out-of-sequence progress). Software features that in effect sever the tie between predecessor and successor activities when the successor has started and the predecessor logic is not satisfied ("progress override") are not be allowed.
3.3.16 Percent Complete

Update the percent complete for each activity started, based on the realistic assessment of earned value. Activities which are complete but for remaining minor punch list work and which do not restrain the initiation of successor activities may be declared 100 percent complete to allow for proper schedule management.

3.3.17 Remaining Duration

Update the remaining duration for each activity based on the number of estimated work days it will take to complete the activity. Remaining duration may not mathematically correlate with percentage found under paragraph entitled Percent Complete.

3.3.18 Cost Loading of Closeout Activities

Cost load the "Correction of punch list from Government pre-final inspection" activity(ies) not less than 1 percent of the present contract value. Activity(ies) may be declared 100 percent complete upon the Government's verification of completion and correction of all punch list work identified during Government pre-final inspection(s).

3.3.18.1 As-Built Drawings

If there is no separate contract line item (CLIN) for as-built drawings, cost load the "Submission and approval of as-built drawings" activity not less than $35,000 or 1 percent of the present contract value, whichever is greater, up to $200,000. Activity will be declared 100 percent complete upon the Government's approval.

3.3.18.2 O & M Manuals

Cost load the "Submission and approval of O & M manuals" activity not less than $20,000. Activity will be declared 100 percent complete upon the Government's approval of all O & M manuals.

3.3.19 Anticipated Adverse Weather

Paragraph applicable to contracts with clause entitled TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER. Reflect the number of anticipated adverse weather delays allocated to a weather sensitive activity in the activity's calendar.

3.3.20 Early Completion Schedule and the Right to Finish Early

An Early Completion Schedule is an Initial Project Schedule (IPS) that indicates all scope of the required contract work will be completed before the contractually required completion date.

a. No IPS indicating an Early Completion will be accepted without being fully resource-loaded (including crew sizes and manhours) and the Government agreeing that the schedule is reasonable and achievable.

b. The Government is under no obligation to accelerate work items it is responsible for to ensure that the early completion is met nor is it responsible to modify incremental funding (if applicable) for the project to meet the contractor's accelerated work.
3.4 PROJECT SCHEDULE SUBMISSIONS

Provide the submissions as described below. The data CD/DVD, reports, and network diagrams required for each submission are contained in paragraph SUBMISSION REQUIREMENTS. If the Contractor fails or refuses to furnish the information and schedule updates as set forth herein, then the Contractor will be deemed not to have provided an estimate upon which a progress payment can be made.

Review comments made by the Government on the schedule(s) do not relieve the Contractor from compliance with requirements of the Contract Documents.

3.4.1 Preliminary Project Schedule Submission

Within 15 calendar days after the NTP is acknowledged submit the Preliminary Project Schedule defining the planned operations detailed for the first 90 calendar days for approval. The approved Preliminary Project Schedule will be used for payment purposes not to exceed 90 calendar days after NTP. Completely cost load the Preliminary Project Schedule to balance the contract award CLINS shown on the Price Schedule. The Preliminary Project Schedule may be summary in nature for the remaining performance period. It must be early start and late finish constrained and logically tied as specified. The Preliminary Project Schedule forms the basis for the Initial Project Schedule specified herein and must include all of the required plan and program preparations, submissions and approvals identified in the contract (for example, Quality Control Plan, Safety Plan, and Environmental Protection Plan) as well as design activities, planned submissions of all early design packages, permitting activities, design review conference activities, and other non-construction activities intended to occur within the first 90 calendar days. Government acceptance of the associated design package(s) and all other specified Program and Plan approvals must occur prior to any planned construction activities. Activity code any activities that are summary in nature after the first 90 calendar days with Bid Item (CLIN) code (BIDI), Responsibility Code (RESP) and Feature of Work code (FOW).

3.4.2 Initial Project Schedule Submission

Submit the Initial Project Schedule for approval within 42 calendar days after notice to proceed is issued. The schedule must demonstrate a reasonable and realistic sequence of activities which represent all work through the entire contract performance period. No payment will be made for work items not fully detailed in the Project Schedule.

3.4.3 Periodic Schedule Updates

Update the Project Schedule on a regular basis, monthly at a minimum. Provide a draft Periodic Schedule Update for review at the schedule update meetings as prescribed in the paragraph PERIODIC SCHEDULE UPDATE MEETINGS. These updates will enable the Government to assess Contractor's progress.

a. Update information including Actual Start Dates (AS), Actual Finish Dates (AF), Remaining Durations (RD), and Percent Complete is subject to the approval of the Government at the meeting.

b. AS and AF dates must match the date(s) reported on the Contractor's Quality Control Report for an activity start or finish.
3.5 SUBMISSION REQUIREMENTS

Submit the following items for the Preliminary Schedule, Initial Schedule, and every Periodic Schedule Update throughout the life of the project:

3.5.1 Data CD/DVDs

Provide two sets of data CD/DVDs containing the current project schedule and all previously submitted schedules in the format of the scheduling software (e.g. .xer). Also include on the data CD/DVDs the Narrative Report and all required Schedule Reports. Label each CD/DVD indicating the type of schedule (Preliminary, Initial, Update), full contract number, Data Date and file name. Each schedule must have a unique file name and use project specific settings.

3.5.2 Narrative Report

Provide a Narrative Report with each schedule submission. The Narrative Report is expected to communicate to the Government the thorough analysis of the schedule output and the plans to compensate for any problems, either current or potential, which are revealed through that analysis. Include the following information as minimum in the Narrative Report:

a. Identify and discuss the work scheduled to start in the next update period.

b. A description of activities along the two most critical paths where the total float is less than or equal to 20 work days.

c. A description of current and anticipated problem areas or delaying factors and their impact and an explanation of corrective actions taken or required to be taken.

d. Identify and explain why activities based on their calculated late dates should have either started or finished during the update period but did not.

e. Identify and discuss all schedule changes by activity ID and activity name including what specifically was changed and why the change was needed. Include at a minimum new and deleted activities, logic changes, duration changes, calendar changes, lag changes, resource changes, and actual start and finish date changes.

f. Identify and discuss out-of-sequence work.

3.5.3 Schedule Reports

The format, filtering, organizing and sorting for each schedule report will be as directed by the Contracting Officer. Typically, reports contain Activity Numbers, Activity Description, Original Duration, Remaining Duration, Early Start Date, Early Finish Date, Late Start Date, Late Finish Date, Total Float, Actual Start Date, Actual Finish Date, and Percent Complete. Provide the reports electronically in .pdf format. Provide two set(s) of hardcopy reports. The following lists typical reports that will be requested:

3.5.3.1 Activity Report

List of all activities sorted according to activity number.
3.5.3.2 Logic Report

List of detailed predecessor and successor activities for every activity in ascending order by activity number.

3.5.3.3 Total Float Report

A list of all incomplete activities sorted in ascending order of total float. List activities which have the same amount of total float in ascending order of Early Start Dates. Do not show completed activities on this report.

3.5.3.4 Earnings Report by CLIN

A compilation of the Total Earnings on the project from the NTP to the data date, which reflects the earnings of activities based on the agreements made in the schedule update meeting defined herein. Provided a complete schedule update has been furnished, this report serves as the basis of determining progress payments. Group activities by CLIN number and sort by activity number. Provide a total CLIN percent earned value, CLIN percent complete, and project percent complete. The printed report must contain the following for each activity: the Activity Number, Activity Description, Original Budgeted Amount, Earnings to Date, Earnings this period, Total Quantity, Quantity to Date, and Percent Complete (based on cost).

3.5.3.5 Schedule Log

Provide a Scheduling/Leveling Report generated from the current project schedule being submitted.

3.5.4 Network Diagram

The Network Diagram is required for the Preliminary, Initial and Periodic Updates. Depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The Contracting Officer will use, but is not limited to, the following conditions to review compliance with this paragraph:

3.5.4.1 Continuous Flow

Show a continuous flow from left to right with no arrows from right to left. Show the activity number, description, duration, and estimated earned value on the diagram.

3.5.4.2 Project Milestone Dates

Show dates on the diagram for start of project, any contract required interim completion dates, and contract completion dates.

3.5.4.3 Critical Path

Show all activities on the critical path. The critical path is defined as the longest path.

3.5.4.4 Banding

Organize activities using the WBS or as otherwise directed to assist in the understanding of the activity sequence. Typically, this flow will group
activities by major elements of work, category of work, work area and/or responsibility.

3.5.4.5 Cash Flow / Schedule Variance Control (SVC) Diagram

With each schedule submission, provide a SVC diagram showing 1) Cash Flow S-Curves indicating planned project cost based on projected early and late activity finish dates, and 2) Earned Value to-date.

3.6 PERIODIC SCHEDULE UPDATE

3.6.1 Periodic Schedule Update Meetings

Conduct periodic schedule update meetings for the purpose of reviewing the proposed Periodic Schedule Update, Narrative Report, Schedule Reports, and progress payment. Conduct meetings at least monthly within five days of the proposed schedule data date. Provide a computer with the scheduling software loaded and a projector which allows all meeting participants to view the proposed schedule during the meeting. The Contractor's authorized scheduler must organize, group, sort, filter, perform schedule revisions as needed and review functions as requested by the Contractor and/or Government. The meeting is a working interactive exchange which allows the Government and Contractor the opportunity to review the updated schedule on a real time and interactive basis. The meeting will last no longer than 8 hours. Provide a draft of the proposed narrative report and schedule data file to the Government a minimum of two workdays in advance of the meeting. The Contractor's Project Manager and scheduler must attend the meeting with the authorized representative of the Contracting Officer. Superintendents, foremen and major subcontractors must attend the meeting as required to discuss the project schedule and work. Following the periodic schedule update meeting, make corrections to the draft submission. Include only those changes approved by the Government in the submission and invoice for payment.

3.6.2 Update Submission Following Progress Meeting

Submit the complete Periodic Schedule Update of the Project Schedule containing all approved progress, revisions, and adjustments, pursuant to paragraph SUBMISSION REQUIREMENTS not later than 4 work days after the periodic schedule update meeting.

3.7 WEEKLY PROGRESS MEETINGS

Conduct a weekly meeting with the Government (or as otherwise mutually agreed to) between the meetings described in paragraph entitled PERIODIC SCHEDULE UPDATE MEETINGS for the purpose of jointly reviewing the actual progress of the project as compared to the as planned progress and to review planned activities for the upcoming two weeks. Use the current approved schedule update for the purposes of this meeting and for the production and review of reports. At the weekly progress meeting, address the status of RFIs, RFPs and Submittals.

3.8 REQUESTS FOR TIME EXTENSIONS

Provide a justification of delay to the Contracting Officer in accordance with the contract provisions and clauses for approval within 10 days of a delay occurring. Also prepare a time impact analysis for each Government request for proposal (RFP) to justify time extensions.
3.8.1 Justification of Delay

Provide a description of the event(s) that caused the delay and/or impact to the work. As part of the description, identify all schedule activities impacted. Show that the event that caused the delay/impact was the responsibility of the Government. Provide a time impact analysis that demonstrates the effects of the delay or impact on the project completion date or interim completion date(s). Evaluate multiple impacts chronologically; each with its own justification of delay. With multiple impacts consider any concurrency of delay. A time extension and the schedule fragnet becomes part of the project schedule and all future schedule updates upon approval by the Contracting Officer.

3.8.2 Time Impact Analysis (Prospective Analysis)

Prepare a time impact analysis for approval by the Contracting Officer based on industry standard AACE 52R-06. Utilize a copy of the last approved schedule prior to the first day of the impact or delay for the time impact analysis. If Contracting Officer determines the time frame between the last approved schedule and the first day of impact is too great, prepare an interim updated schedule to perform the time impact analysis. Unless approved by the Contracting Officer, no other changes may be incorporated into the schedule being used to justify the time impact.

3.8.3 Forensic Schedule Analysis (Retrospective Analysis)

Prepare an analysis for approval by the Contracting Officer based on industry standard AACE 29R-03.

3.8.4 Fragmentary Network (Fragnet)

Prepare a proposed fragnet for time impact analysis consisting of a sequence of new activities that are proposed to be added to the project schedule to demonstrate the influence of the delay or impact to the project's contractual dates. Clearly show how the proposed fragnet is to be tied into the project schedule including all predecessors and successors to the fragnet activities. The proposed fragnet must be approved by the Contracting Officer prior to incorporation into the project schedule.

3.8.5 Time Extension

The Contracting Officer must approve the Justification of Delay including the time impact analysis before a time extension will be granted. No time extension will be granted unless the delay consumes all available Project Float and extends the projected finish date ("End Project" milestone) beyond the Contract Completion Date. The time extension will be in calendar days.

Actual delays that are found to be caused by the Contractor's own actions, which result in a calculated schedule delay will not be a cause for an extension to the performance period, completion date, or any interim milestone date.

3.8.6 Impact to Early Completion Schedule

No extended overhead will be paid for delay prior to the original Contract Completion Date for an Early Completion IPS unless the Contractor actually performed work in accordance with that Early Completion Schedule. The Contractor must show that an early completion was achievable had it not...
been for the impact.

3.9 FAILURE TO ACHIEVE PROGRESS

Should the progress fall behind the approved project schedule for reasons other than those that are excusable within the terms of the contract, the Contracting Officer may require provision of a written recovery plan for approval. The plan must detail how progress will be made-up to include which activities will be accelerated by adding additional crews, longer work hours, extra work days, etc.

3.9.1 Artificially Improving Progress

Artificially improving progress by means such as, but not limited to, revising the schedule logic, modifying or adding constraints, shortening activity durations, or changing calendars in the project schedule is prohibited. Indicate assumptions made and the basis for any logic, constraint, duration and calendar changes used in the creation of the recovery plan. Any additional resources, manpower, or daily and weekly work hour changes proposed in the recovery plan must be evident at the work site and documented in the daily report along with the Schedule Narrative Report.

3.9.2 Failure to Perform

Failure to perform work and maintain progress in accordance with the supplemental recovery plan may result in an interim and final unsatisfactory performance rating and/or may result in corrective action directed by the Contracting Officer pursuant to FAR 52.236-15 Schedules for Construction Contracts, FAR 52.249-10 Default (Fixed-Price Construction), and other contract provisions.

3.9.3 Recovery Schedule

Should the Contracting Officer find it necessary, submit a recovery schedule pursuant to FAR 52.236-15 Schedules for Construction Contracts.

3.10 OWNERSHIP OF FLOAT

Except for the provision given in the paragraph IMPACT TO EARLY COMPLETION SCHEDULE, float available in the schedule, at any time, may not be considered for the exclusive use of either the Government or the Contractor including activity and/or project float. Activity float is the number of work days that an activity can be delayed without causing a delay to the "End Project" finish milestone. Project float (if applicable) is the number of work days between the projected early finish and the contract completion date milestone.

3.11 TRANSFER OF SCHEDULE DATA INTO RMS/QCS

Import the schedule data into the Quality Control System (QCS) and export the QCS data to the Government. This data is considered to be additional supporting data in a form and detail required by the Contracting Officer pursuant to FAR 52.232-5 - Payments under Fixed-Price Construction Contracts. The receipt of a proper payment request pursuant to FAR 52.232-27 - Prompt Payment for Construction Contracts is contingent upon the Government receiving both acceptable and approvable hard copies and matching electronic export from QCS of the application for progress payment.
3.12 PRIMAVERA P6 MANDATORY REQUIREMENTS

If Primavera P6 is being used, request a backup file template (.xer) from the Government, if one is available, prior to building the schedule. The following settings are mandatory and required in all schedule submissions to the Government:

a. Activity Codes must be Project Level, not Global or EPS level.
b. Calendars must be Project Level, not Global or Resource level.
c. Activity Duration Types must be set to "Fixed Duration & Units".
d. Percent Complete Types must be set to "Physical".
e. Time Period Admin Preferences must remain the default "8.0 hr/day, 40 hr/week, 172 hr/month, 2000 hr/year". Set Calendar Work Hours/Day to 8.0 Hour days.
f. Set Schedule Option for defining Critical Activities to "Longest Path".
g. Set Schedule Option for defining progressed activities to "Retained Logic".
h. Set up cost loading using a single lump sum labor resource. The Price/Unit must be $1/hr, Default Units/Time must be "8h/d", and settings "Auto Compute Actuals" and "Calculate costs from units" selected.
i. Activity ID's must not exceed 10 characters.
j. Activity Names must have the most defining and detailed description within the first 30 characters.

-- End of Section --
PART 1   GENERAL

1.1 SUMMARY

The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections.

Units of weights and measures used on all submittals are to be the same as those used in the contract drawings.

Each submittal is to be complete and in sufficient detail to allow ready determination of compliance with contract requirements.

Contractor's Quality Control (CQC) System Manager to check and approve all items prior to submittal and stamp, sign, and date indicating action taken. Proposed deviations from the contract requirements are to be clearly identified. Include within submittals items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals.

Submittals requiring Government approval are to be scheduled and made prior to the acquisition of the material or equipment covered thereby. Pick up and dispose of samples not incorporated into the work in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

A submittal register showing items of equipment and materials for when submittals are required by the specifications is provided as "Submittal Register".

1.2 DEFINITIONS

1.2.1 Submittal Descriptions (SD)

Submittals requirements are specified in the technical sections. Submittals are identified by Submittal Description (SD) numbers and titles as follows:

SD-01 Preconstruction Submittals

Submittals which are required prior to or the start of the next major phase of the construction on a multi-phase contract, includes schedules, tabular list of data, or tabular list including location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the work.

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 (QC) plan
Environmental protection plan

SD-02 Shop Drawings

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

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

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

SD-03 Product Data

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

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

SD-04 Samples

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

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

Field samples and mock-ups constructed on the project site establish standards by which the ensuring work can be judged. Includes assemblies or portions of assemblies which are to be incorporated into the project and those which will be removed at conclusion of the work.
SD-05 Design Data

Design 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. Unless specified in another section, 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 logs and checklists.

Final acceptance test and operational test procedure.

SD-07 Certificates

Statements printed on the manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that the 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 manufacturer, supplier, installer or Subcontractor through Contractor. The document purpose is to further promote the 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 (MSDS) concerning impedances, hazards and safety precautions.

SD-09 Manufacturer's Field Reports

Documentation of the testing and verification actions taken by manufacturer's representative at the job site, in the vicinity of the job site, or on a sample taken from the job site, on a portion of the work, during or after installation, to confirm compliance with manufacturer's standards or instructions. The documentation must be signed by an authorized official of a testing laboratory or agency and
state the test results; and indicate whether the material, product, or system has passed or failed the test.

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, including manufacturer's help and product line documentation necessary to maintain and install equipment. This data is needed by operating and maintenance personnel for the safe and efficient operation, maintenance and repair of the item.

This data is intended to be incorporated in an operations and maintenance manual or control system.

SD-11 Closeout Submittals

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

Submittals required for Guiding Principle Validation (GPV) or Third Party Certification (TPC).

Special requirements necessary to properly close out a construction contract. For example, Record Drawings and as-built drawings. Also, submittal requirements necessary to properly close out a major phase of construction on a multi-phase contract.

1.2.2 Approving Authority

Office or designated person authorized to approve submittal.

1.2.3 Work

As used in this section, on- and off-site construction required by contract documents, including labor necessary to produce submittals, except those SD-01 Pre-Construction Submittals noted above, construction, materials, products, equipment, and systems incorporated or to be incorporated in such construction.

1.3 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. Submittals with an "S" are for inclusion in the Sustainability Notebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with this section.

SD-01 Preconstruction Submittals

Submittal Register; G

1.4 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:
1.4.1 Designer of Record Approved (DA)

Designer of Record (DOR) approval is required for extensions of design, critical materials, any deviations from the solicitation, the accepted proposal, or the completed design, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION, they are considered to be "shop drawings." Contractor to provide the Government with the number of copies designated hereinafter of all DOR approved submittals. The Government may review any or all Designer of Record approved submittals for conformance to the Solicitation, Accepted Proposal and the completed design. The Government will review all submittals designated as deviating from the Solicitation or Accepted Proposal, as described below. Generally, design submittals should be identified as SD-05 Design Data submittals.

1.4.2 Government Approved (G)

Government approval is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION, they are considered to be "shop drawings."

1.4.3 For Information Only

Submittals not requiring Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.

1.4.4 Sustainability Reporting Submittals (S)

Submittals for Guiding Principle Validation (GPV) or Third Party Certification (TPC) are indicated with an "S" designation. Submit the information required by the technical sections that demonstrates compliance with the sustainable requirement, and for inclusion in the Sustainability Notebook as required by Section 01 33 29 SUSTAINABILITY REPORTING. A full submittal for an item may be provided under another SD; however, for the "S" submittal, only provide that portion of the submittal that demonstrates compliance with the sustainable requirement. If the sustainable submittal does require Government Approval, it may be tagged under another SD with a "G."

Schedule submittals for these items throughout the course of construction as provided; do not wait until closeout.

1.5 PREPARATION

1.5.1 Transmittal Form

Use the attached sample transmittal form (ENG Form 4025) for submitting both Government approved and information only submittals in accordance with the instructions on the reverse side of the form. These forms are included in the QCS software that the Contractor is required to use for this contract. Properly complete this form by filling out all the heading blank spaces and identifying each item submitted. Exercise special care to ensure proper
listing of the specification paragraph and sheet number of the contract drawings pertinent to the data submitted for each item.

1.5.2 Source Drawings for Shop Drawings

The entire set of Source Drawing files (DWG) will not be provided to the Contractor. Only those requested by the Contractor to prepare shop drawings may be provided. Request the specific Drawing Number only for the preparation of Shop Drawings. These drawings may only be provided after award.

1.5.2.1 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 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 Source Drawing files are not construction documents. Differences may exist between the Source Drawing files and the corresponding construction documents. The Government makes no representation regarding the accuracy or completeness of the electronic Source Drawing 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 data related to this contract, remove all previous indicia of ownership (seals, logos, signatures, initials and dates).

1.5.3 Electronic File Format

Provide submittals in electronic format, with the exception of material samples required for SD-04 Samples items. In addition to the electronic submittal, provide three hard copies of the submittals. Compile the submittal file as a single, complete document, to include the Transmittal Form described within. Name the electronic submittal file specifically according to its contents, coordinate the file naming convention with the Contracting Officer. Electronic files must be of sufficient quality that all information is legible. Use PDF as the electronic format, unless otherwise specified or directed by the Contracting Officer. Generate PDF files from original documents with bookmarks so that the text included in the PDF file is both searchable and can be copied. If documents are scanned, Optical Character Resolution (OCR) routines are required. Index and bookmark files exceeding 30 pages to allow efficient navigation of the
file. When required, the electronic file must include a valid electronic signature, or scan of a signature.

Email electronic submittal documents fewer than 10MB to an email address as directed by the Contracting Officer. Provide electronic documents over 10MB on an optical disc, or through an electronic file sharing system such as the AMRDEC SAFE Web Application located at the following website: https://safe.amrdec.army.mil/safe/.

Provide hard copies of submittals when requested by the Contracting Officer. Up to two additional hard copies of any submittal may be requested at the discretion of the Contracting Officer, at no additional cost to the Government.

1.6 QUANTITY OF SUBMITTALS

1.6.1 Number of Copies of SD-02 Shop Drawings

Submit six copies of submittals of shop drawings requiring review and approval only by QC organization and seven copies of shop drawings requiring review and approval by Contracting Officer.

1.6.2 Number of Copies of SD-03 Product Data and SD-08 Manufacturer's Instructions

Submit in compliance with quantity requirements specified for shop drawings.

1.6.3 Number of Samples SD-04 Samples

a. Submit two samples, or two sets of samples showing range of variation, of each required item. One approved sample or set of samples will be retained by approving authority and one will be returned to Contractor.

b. Submit one sample panel or provide one sample installation where directed. Include components listed in technical section or as directed.

c. Submit one sample installation, where directed.

d. Submit one sample of non-solid materials.

1.6.4 Number of Copies SD-05 Design Data and SD-07 Certificates

Submit in compliance with quantity requirements specified for shop drawings.

1.6.5 Number of Copies SD-06 Test Reports and SD-09 Manufacturer's Field Reports

Submit in compliance with quantity and quality requirements specified for shop drawings other than field test results that will be submitted with QC reports.

1.6.6 Number of Copies of SD-10 Operation and Maintenance Data

Submit three copies of O&M Data to the Contracting Officer for review and approval.
1.6.7 Number of Copies of SD-01 Preconstruction Submittals and SD-11 Closeout Submittals

Unless otherwise specified, submit two sets of administrative submittals.

1.7 INFORMATION ONLY SUBMITTALS

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

1.8 SUBMITTAL REGISTER

Prepare and maintain submittal register, as the work progresses. Do not change data which is output in columns (c), (d), (e), and (f) as delivered by Government; retain data which is output in columns (a), (g), (h), and (i) as approved. A submittal register showing items of equipment and materials for which submittals are required by the specifications is provided as an attachment. This list may not be all inclusive and additional submittals may be required. Maintain a submittal register for the project in accordance with Section 01 45 00.15 10 RESIDENT MANAGEMENT SYSTEM CONTRACTOR MODE (RMS CM).

Column (c): Lists specification section in which submittal is required.

Column (d): Lists each submittal description (SD No. and type, e.g. SD-02 Shop Drawings) required in each specification section.

Column (e): Lists one principal paragraph in specification section where a material or product is specified. This listing is only to facilitate locating submitted requirements. Do not consider entries in column (e) as limiting project requirements.

Thereafter, the Contractor is to track all submittals by maintaining a complete list, including completion of all data columns, including dates on which submittals are received and returned by the Government.

1.8.1 Use of Submittal Register

Submit submittal register. Submit with QC plan and project schedule. Verify that all submittals required for project are listed and add missing submittals. Coordinate and complete the following fields on the register submitted with the QC plan and the project schedule:

Column (a) Activity Number: Activity number from the project schedule.

Column (g) Contractor Submit Date: Scheduled date for approving authority to receive submittals.
1.8.2 Contractor Use of Submittal Register

Update the following fields with each submittal throughout contract.

Column (b) Transmittal Number: Contractor assigned list of consecutive numbers.

Column (j) Action Code (k): Date of action used to record Contractor's review when forwarding submittals to QC.

Column (l) List date of submittal transmission.

Column (q) List date approval received.

1.8.3 Approving Authority Use of Submittal Register

Update the following fields.

Column (b) Transmittal Number: Contractor assigned list of consecutive numbers.

Column (l) List date of submittal receipt.

Column (m) through (p) List Date related to review actions.

Column (q) List date returned to Contractor.

1.8.4 Copies Delivered to the Government

Deliver one copy of submittal register updated by Contractor to Government with each invoice request.

1.9 VARIATIONS

Variations from contract requirements require both Designer of Record (DOR) and Government approval pursuant to contract Clause FAR 52.236-21 and will be considered where advantageous to Government.

1.9.1 Considering Variations

Discussion with Contracting Officer prior to submission, after consulting with the DOR, will help ensure functional and quality requirements are met and minimize rejections and re-submittals. When contemplating a variation which results in lower cost, consider submission of the variation as a Value Engineering Change Proposal (VECP).

Specifically point out variations from contract requirements in transmittal letters. Failure to point out deviations may result in the Government requiring rejection and removal of such work at no additional cost to the Government.
1.9.2 Proposing Variations

When proposing a variation, deliver a written request to the Contracting Officer, with documentation of the nature and features of the variation and why the variation is desirable and beneficial to Government, including the DOR's written analysis and approval. If lower cost is a benefit, also include an estimate of the cost savings. In addition to documentation required for variation, include the submittals required for the item. Clearly mark the proposed variation in all documentation.

Check the column "variation" of ENG Form 4025 for submittals which include proposed deviations requested by the Contractor. Set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

1.9.3 Warranting that Variations are Compatible

When delivering a variation for approval, Contractor, including its Designer(s) of Record, warrants that this contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of work.

1.9.4 Review Schedule Extension

In addition to normal submittal review period, a period of 10 working days will be allowed for consideration by the Government of submittals with variations.

1.10 SCHEDULING

Schedule and submit concurrently submittals covering component items forming a system or items that are interrelated. Include certifications to be submitted with the pertinent drawings at the same time. No delay damages or time extensions will be allowed for time lost in late submittals. An additional 15 calendar days will be allowed and shown on the register for review and approval of submittals for food service equipment and refrigeration and HVAC control systems.

a. Coordinate scheduling, sequencing, preparing and processing of submittals with performance of work so that work will not be delayed by submittal processing. Allow for potential resubmittal of requirements.

b. Submittals called for by the contract documents will be listed on the register. If a submittal is called for but does not pertain to the contract work, the Contractor is to include the submittal in the register and annotate it "N/A" with a brief explanation. Approval by the Contracting Officer does not relieve the Contractor of supplying submittals required by the contract documents but which have been omitted from the register or marked "N/A."

c. Re-submit register and annotate monthly by the Contractor with actual submission and approval dates. When all items on the register have been fully approved, no further re-submittal is required.

d. Carefully control procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."
1.11 GOVERNMENT APPROVING AUTHORITY

When approving authority is Contracting Officer, the Government will:

a. Note date on which submittal was received.

b. Review submittals for approval within scheduling period specified and only for conformance with project design concepts and compliance with contract documents.

c. Identify returned submittals with one of the actions defined in paragraph REVIEW NOTATIONS and with markings appropriate for action indicated.

Upon completion of review of submittals requiring Government approval, stamp and date submittals. Four (4) copies of the submittal will be retained by the Contracting Officer and two (2) copies of the submittal will be returned to the Contractor. If the Government performs a conformance review of other Designer of Record approved submittals, the submittals will be so identified and returned, as described above.

1.11.1 Review Notations

Contracting Officer review will be completed within 30 calendar days after date of submission. Submittals will be returned to the Contractor with the following notations:

a. Submittals marked "approved" or "accepted" authorize the Contractor to proceed with the work covered.

b. Submittals marked "approved as noted" or "approved, except as noted, resubmittal not required," authorize the Contractor to proceed with the work covered provided he takes no exception to the corrections.

c. Submittals marked "not approved" or "disapproved," or "revise and resubmit," indicate noncompliance with the contract requirements or design concept, or that submittal is incomplete. Resubmit with appropriate changes. No work shall proceed for this item until resubmittal is approved.

d. Submittals marked "not reviewed" will indicate submittal has been previously reviewed and approved, is not required, does not have evidence of being reviewed and approved by Contractor, or is not complete. A submittal marked "not reviewed" 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.

1.12 DISAPPROVED OR REJECTED SUBMITTALS

Make corrections required by the Contracting Officer. If the Contractor considers any correction or notation on the returned submittals to constitute a change to the contract drawings or specifications; notice as required under the FAR clause entitled CHANGES, is to be given to the Contracting Officer. Contractor is responsible for the dimensions and design of connection details and construction of work. Failure to point out deviations may result in the Government requiring rejection and removal of such work at the Contractor's expense.
If changes are necessary to submittals, make such revisions and submission of the submittals in accordance with the procedures above. No item of work requiring a submittal change is to be accomplished until the changed submittals are approved.

1.13 APPROVED/ACCEPTED SUBMITTALS

The Contracting Officer's approval or acceptance of submittals is not to be construed as a complete check, and indicates only that the general method of construction, materials, detailing and other information are satisfactory.

Approval or acceptance will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Contractor Quality Control (CQC) requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work.

After submittals have been approved or accepted by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.14 APPROVED SAMPLES

Approval of a sample is only for the characteristics or use named in such approval and is not be construed to change or modify any contract requirements. Before submitting samples, the Contractor to assure that the materials or equipment will be available in quantities required in the project. No change or substitution will be permitted after a sample has been approved.

Match the approved samples for materials and equipment incorporated in the work. If requested, approved samples, including those which may be damaged in testing, will be returned to the Contractor, at his expense, upon completion of the contract. Samples not approved will also be returned to the Contractor at its expense, if so requested.

Failure of any materials to pass the specified tests will be sufficient cause for refusal to consider, under this contract, any further samples of the same brand or make of that material. Government reserves the right to disapprove any material or equipment which previously has proved unsatisfactory in service.

Samples of various materials or equipment delivered on the site or in place may be taken by the Contracting Officer for testing. Samples failing to meet contract requirements will automatically void previous approvals. Contractor to replace such materials or equipment to meet contract requirements.

Approval of the Contractor's samples by the Contracting Officer does not relieve the Contractor of his responsibilities under the contract.

1.15 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained.
1.16 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets contract requirements is to be similar to the following:
TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE
(Read instruction on the reverse side prior to initiating this form)

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS
(This section will be initiated by the contractor)

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<th>FROM:</th>
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CHECK ONE:

- □ THIS IS A NEW TRANSMITTAL
- □ THIS IS A RESUBMITTAL OF TRANSMITTAL

SPECIFICATION SEC. NO. (Cover only one section with each transmittal) PROJECT TITLE AND LOCATION

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<th>DRAWING SHEET NO.</th>
<th>VARIATION (See instruction No. 6)</th>
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REMARKS

I certify that the above submitted items have been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as otherwise stated.

NAME AND SIGNATURE OF CONTRACTOR

SECTION II - APPROVAL ACTION

ENCLOSURES RETURNED (List by Item No.) NAME, TITLE AND SIGNATURE OF APPROVING AUTHORITY DATE

ENG FORM 4025, OCT 99 (ER 415-1-10) EDITION OF AUG 89 IS OBSOLETE SHEET ____ OF ____ (Proponent: CEMP-CE)
INSTRUCTIONS

1. Section 1 will be initiated by the Contractor in the required number of copies.

2. Each transmittal shall be numbered consecutively in the space provided for "Transmittal No.". This number, in addition to the contract number, will form a serial number for identifying each transmittal. For new submittals or resubmits mark the appropriate box; on resubmittals, insert transmittal number of last submission as well as the new transmittal number.

3. The "Item No." will be the same "Item No." as indicated on ENG FORM 4288 for each entry on this form.

4. Submittals requiring expeditious handling will be submitted on a separate form.

5. Separate transmittal form will be used for submittals under separate sections of the specifications.

6. A check shall be placed in the "Variation" column when a submittal is not in accordance with the plans and specifications--also, a written statement to that effect shall be included in the space provided for "Remarks".

7. Form is self-transmittal, letter of transmittal is not required.

8. When a sample of material or Manufacturer's Certificate of Compliance is transmitted, indicate "Sample" or "Certificate" in column c, Section I.

9. U.S. Army Corps of Engineers approving authority will assign action codes as indicated below in space provided in Section I, column i to each item submitted. In addition they will ensure enclosures are indicated and attached to the form prior to return to the contractor. The Contractor will assign action codes as indicated below in Section I, column g, to each item submitted.

   THE FOLLOWING ACTION CODES ARE GIVEN TO ITEMS SUBMITTED

   A -- Approved as submitted.
   B -- Approved, except as noted on drawings.
   C -- Approved, except as noted on drawings.
       Refer to attached sheet resubmission required
   D -- Will be returned by separate correspondence.
   E -- Disapproved (See attached).
   F -- Receipt acknowledge.
   FX -- Receipt acknowledged, does not comply as noted with contract requirements.
   G -- Other (Specify)

10. Approval of items does not relieve the contractor from complying with all the requirements of the contract plans and specifications.
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<th>ACTIVITY NO</th>
<th>TRANSMITTAL SPEC</th>
<th>CONTRACT: SCHEDULE DATES</th>
<th>CONTRACTOR ACTION</th>
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## SUBMITTAL REGISTER

**TITLE AND LOCATION**

SECURE COMPUTING FACILITY, ERDC, VICKSBURG, MS

**CONTRACTOR**

**SUBMITTAL REGISTER**

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<th>ACTIVITY NO.</th>
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<th>DESCRIPTION</th>
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**TITLE AND LOCATION**
SECURE COMPUTING FACILITY, ERDC, VICKSBURG, MS

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## SD-06 Test Reports

1. **Water Absorption**
2. **Accelerated Weathering**
3. **Resistance to Chloride Ion Penetration**
4. **Moisture Vapor Transmission**
5. **Scaling Resistance**
6. **Water Penetration and Leakage**

## SD-07 Certificates

1. **Manufacturer’s Qualifications**
2. **Applicator’s Qualifications**
3. **Evidence of Acceptable Variation**
4. **Warranty**

## SD-08 Manufacturer’s Instructions

1. **Application**
2. **Safety Data Sheets**

## SD-03 Product Data

1. **Manufacturer’s Standard Details**
2. **Board Insulation**
3. **Accessories**

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### Notes

- **07 19 00**
- **07 21 13**

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**SUBMITTAL REGISTER**

**CONTRACTOR**

**TITLE AND LOCATION**

SECURE COMPUTING FACILITY, ERDC, VICKSBURG, MS

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**TITLE AND LOCATION**
SECURE COMPUTING FACILITY, ERDC, VICKSBURG, MS

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- **SD-08 Manufacturer’s Instructions**
- **SD-02 Shop Drawings**
- **SD-03 Product Data**
- **SD-05 Design Data**
- **SD-10 Operation and Maintenance Data**
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**Title and Location:** Secure Computing Facility, ERDC, Vicksburg, MS

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## SUBMITTAL REGISTER

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** SECURE COMPUTING FACILITY, ERDC, VICKSBURG, MS **

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## SUBMITTAL REGISTER

### SECURE COMPUTING FACILITY, ERDC, VICKSBURG, MS

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**SUBMITTAL FORM**

**PREVIOUS EDITION IS OBSOLETE**
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SECURE COMPUTING FACILITY, ERDC, VICKSBURG, MS

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SECURE COMPUTING FACILITY, ERDC, VICKSBURG, MS

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**TITLE AND LOCATION**

SECURE COMPUTING FACILITY, ERDC, VICKSBURG, MS

**CONTRACTOR**

**CONTRACT NO.**

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**SUBMITTAL REGISTER**

**TITLE AND LOCATION**

SECURE COMPUTING FACILITY, ERDC, VICKSBURG, MS

**CONTRACTOR**

**CONTRACT NO.**

**SUBMITTAL REGISTER**

**PREVIOUS EDITION IS OBSOLETE**

**PAGE 70 OF 76 PAGES**
### SUBMITTAL REGISTER

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**SECURE COMPUTING FACILITY, ERDC, VICKSBURG, MS**

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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)


COUNCIL ON ENVIRONMENTAL QUALITY (CEQ) (WHITE HOUSE)


U.S. DEPARTMENT OF ENERGY (DOE)


U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

SNAP (2016) EPA’s Significant New Alternatives Policy Program

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

40 CFR 247 Comprehensive Procurement Guideline for Products Containing Recovered Materials

1.2 SUMMARY

This specification includes general requirements and procedures for this project to be constructed and documented per the federally mandated High Performance and Sustainable Building or HPSB Guiding Principles (GP), UFC 1-200-02, High Performance and Sustainable Building Requirements, and other requirements identified in this specification.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals
GUIDING PRINCIPLES VALIDATION (GPV)

Provide construction related sustainability documentation to verify achievement of HPSB Guiding Principles Validation (GPV). Provide the following for GPV:

a. Refer to Attachment 1, HPSB Checklist at the end of this specification section.

b. Obtain approval of any changes to the HPSB Checklist from the Contracting Officer at the Preconstruction Conference. Contracting Officer's approval establishes identified HPSB Guiding Principles Requirements as the project's sustainability goals. No variations or substitutions to the HPSB Checklist are allowed without written consent from the Contracting Officer. Immediately bring to the attention of the Contracting Officer any changes that impact meeting the approved HPSB Guiding Principles Requirements for this project and demonstrate that change will not incur additional construction cost or increase the life cycle cost.

c. Provide all work required to incorporate the applicable HPSB Guiding Principles Requirements indicated on the HPSB Checklist and in this contract.

d. Provide Sustainability Action Plan

1.4.1 Sustainability Action Plan

Include the following information in the Sustainability Action Plan:

a. Planned method to achieve each construction related GP requirement.

b. For each designated construction related HPSB Guiding Principles Requirements that is not achieved, provide narrative explaining how mission or activity precludes achieving specific sustainability requirement or goal. Provide analysis of particular requirement and level to which project is able to comply. Final government-approved narrative(s) must be included with the HPSB Checklist submittal.

c. Name and contact information for: POC responsible for ensuring sustainability goals are accomplished and documentation is assembled.
d. Include the Indoor Air Quality plan with the Sustainability Action Plan.

1.4.2 Costs

Bear all costs associated with constructing and demonstrating that project complies with approved HPSB Guiding Principles Requirements.

1.4.3 Calculations

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

1.5 SUSTAINABILITY SUBMITTALS

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

1.5.1 High Performance Sustainable Building (HPSB) Checklist

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

1.5.1.1 HPSB Checklist Submittals

Submit updated HPSB Checklist with each Sustainability eNotebook submittal. Attach final HPSB Checklist to draft final DD1354 Real Property Record Submittal.

1.5.2 "S" Submittals for Sustainability Documentation

Submit the GPV sustainability documentation required in this specification as "S" submittals in all affected UFGS Sections. Highlight GPV compliance data in "S" submittal.

1.5.3 Sustainability eNotebook

Provide and maintain a comprehensive Sustainability eNotebook to document compliance with the sustainability requirements identified in the approved HPSB Checklist. Sustainability eNotebook must contain all required data to support full compliance with the HPSB Guiding Principles Requirements, including HPSB checklist, Sustainable Action Plan, calculations, labels, certifications. Sustainability eNotebook is in the form of an Adobe PDF file; bookmarked at each HPSB Guiding Principles Requirement and sub-bookmarked at each document. Match format to HPSB Guiding Principles numbering system indicated herein. Maintain up to date information, spreadsheets, templates, and other required documentation with each current submittal.

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

1.5.3.1 Sustainability eNotebook Submittal Schedule

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

a. Preliminary Sustainability eNotebook

Submit preliminary Sustainability eNotebook for approval at the Pre-construction conference. Include Preliminary High Performance and Sustainable Building Checklist.

b. Construction Progress Meetings. Update GP documentation in the Sustainability eNotebook for each meeting.

c. Final Sustainability eNotebook

Submit updated Sustainability eNotebook at the Beneficial Occupancy Date (BOD). Final progress payment retainage may be held by Contracting Officer until final sustainability documentation is complete. Include Final High Performance and Sustainable Building Checklist.

d. Amended Final Sustainability eNotebook

Amend and resubmit the Final Sustainability eNotebook to include post-occupancy corrections, updates, and requirements. Include Amended Final High Performance and Sustainable Building Checklist. Final progress payment retainage may be held by Contracting Officer until amended final sustainability documentation is complete. Submit 2 final electronic copies of the Amended Final Sustainability eNotebook Submittal on DVDs to the Government no longer than 30 days after the GP designated data collection period.

1.6 DOCUMENTATION REQUIREMENTS

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

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

1.6.1 Commissioning

Submit approved Final Commissioning Report required by Section 01 91 00.15 TOTAL BUILDING COMMISSIONING as proof of this tracking requirement.

1.6.2 Energy Efficient Products

Provide only energy-using products that are Energy Star rated, or have the Federal Energy Management Program (FEMP) recommended efficiency. Where Energy Star or FEMP recommendations have not been established, provide most efficient products that are life-cycle cost effective. Provide only energy using products that meet FEMP requirements for low standby power consumption. Energy efficient products can be found at: https://energy.gov/eere/femp/federal-energy-management-program and https://www.energystar.gov/. Provide the following documentation:
Proof that products are labeled energy efficient and comply with the cited requirements.

1.6.3 Indoor Water Use

Provide only water-consuming products that are EPA WaterSense labeled, or the most efficient water fixtures available that meet the requirements of ASHRAE 189.1 Section 6.3.2, when EPA WaterSense products are not available. Provide the following documentation:

For products available with EPA WaterSense labeling, proof that fixtures are labeled EPA WaterSense or Energy Star; for all other fixtures, proof they comply with the cited efficiency requirements.

1.6.4 Reduce Volatile Organic Compounds (VOC) (Low Emitting Materials)

Meet the requirements of Table 3-1 at the end of this specification. Provide the following documentation:

Provide certifications or labels that demonstrate compliance with cited requirements.

1.6.5 Indoor Air Quality During Construction

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

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

1.6.6 Recycled Content

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

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

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

1.6.7 Ozone Depleting Substances

Meet the requirements of ASHRAE 189.1 Section 9.3.3 Refrigerants for no CFC-based refrigerants in heating ventilation, air conditioning and refrigeration systems (except for fire suppression system requirements, covered elsewhere in this specification). Where feasible, use products
from U.S. EPA Significant New Alternatives Policy (SNAP) (https://www.epa.gov/snap) or meet the criteria of SNAP. Provide the following documentation:

a. SDS sheets for all refrigerants.

b. Provide label for each product meeting the cited standards.

1.6.8 Waste Material Management (Recycling – Construction)

Divert construction debris from landfill disposal where markets or on-site recycling exists, and provide documentation in accordance with Section 01 74 19 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 SUSTAINABILITY COORDINATION

3.1.1 Coordinating Sustainability Documentation Progress

Provide sustainability focus and coordination at the following meetings to achieve sustainability goals. The designated sustainability professional responsible for GP documentation must participate in the following meetings to coordinate documentation completion.

a. Pre-Construction Conference: Discuss the following: HPSB Checklist, Sustainability Action Plan, Construction submittal requirements and schedule, individuals responsible for achieving each Guiding Principle Requirement.

b. Construction Progress Meetings: Review GP sustainability requirements with project team including contractor and sub-contractor representatives. Demonstrate GP documentation is being collected and updated to the Sustainability eNotebook.

(1) Facility Turnover Meetings: Review Sustainability eNotebook for completeness and identify any outstanding issues relating to final documentation requirements.

(2) Final Sustainability eNotebook Review
3.2 *TABLE 3-1 VOLATILE ORGANIC COMPOUNDS (VOC) (LOW EMITTING MATERIALS)*

REQUIREMENTS

Refer to following table, based on ASHRAE 189.1 section 8.4.2 (Materials), for compliance criteria.

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<th>MATERIAL CATEGORY</th>
<th>EMISSIONS REQUIREMENT</th>
<th>MATERIALS WITH ADDED VOC REQUIREMENT</th>
<th>MATERIAL CATEGORY</th>
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<td>Adhesives and Sealants</td>
<td>CDPH/EHLB/Standard method V1.1 (California Section 01350) (Use &quot;office&quot; or &quot;classroom&quot; space limits for all applications)</td>
<td>or Adhesives (carpet, resilient, wood flooring; panel; primers) Sealants (acoustical; firestop; HVAC Air duct; primers) Caulks</td>
<td>or SCAQMD Rule 1168 (Use &quot;other&quot; category for HVAC duct sealant) (for firestop adhesive, UFC 3-600-01 overrides conflicting requirements)</td>
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<td>Paints and Coatings</td>
<td>CDPH/EHLB/Standard method V1.1 (California Section 01350) (Use &quot;office&quot; or &quot;classroom&quot; space limits for all applications)</td>
<td>or Flat and nonflat topcoats, primers, undercoaters, and anti-corrosive coatings</td>
<td>or Green Seal Standard GS-11 (except: cleaners, solvent cements, and primers used with plastic piping and conduit in plumbing, fire suppression, and electrical systems; HVAC air duct sealants when the application space air temp is less than 40 F (4.5 C)).</td>
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<td>MATERIALS WITH ADDED VOC REQUIREMENT</td>
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<tr>
<td>Paints and Coatings</td>
<td>CDPH/EHLB/Standard method V1.1 (California Section 01350) (Use &quot;office&quot; or &quot;classroom&quot; space limits for all applications)</td>
<td>Concrete/masonry sealers (waterproofing concrete/masonry sealers), concrete curing compounds, dry fog coatings, faux finishing coatings, fire resistive coatings, floor coatings, graphic arts (sign) coatings, industrial maintenance coatings, mastic texture coatings, metallic pigmented coatings, multicolor coatings, pretreatment wash primers, reactive penetrating sealers, recycled coatings, shellacs (clear and opaque), specialty primers, stains, wood coatings (clear wood finishes), wood preservatives, and zinc primers</td>
<td>California Air Resources Board (CARB) Suggested Control Measure for Architectural Coatings or SCAQMD Rule 1113</td>
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### TABLE 3-1  Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements

UFGS 01 33 29, Para 1.6.5 Submittal Requirements (Interior Applications Only)

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<td>CDPH/EHLB/Standard method V1.1 (California Section 01350) (Use &quot;office&quot; or &quot;classroom&quot; space limits for all applications)</td>
<td>or Basement specialty coatings, high-temperature coatings, low solids coatings, stone consolidants, swimming-pool coatings, tub-and tile-refining coatings, and waterproofing membranes</td>
<td>California Air Resources Board (CARB) Suggested Control Measure for Architectural Coatings</td>
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<td>Floor Covering Materials</td>
<td>For carpet, all locations: CDPH/EHLB/Standard Method V1.1 (California Section 01350) or label for Section 9 of CDPH/EHLB/Standard Method V1.1 (California Section 01350)</td>
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<td>Composite Wood, Wood Structural Panel, and Agrifiber Products</td>
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<td>including laminating adhesives for composite wood and agrifiber assemblies</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

UFGS 01 33 29, Para 1.6.5 Submittal Requirements (Interior Applications Only)
### TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements

UFGS 01 33 29, Para 1.6.5 Submittal Requirements (Interior Applications Only)

<table>
<thead>
<tr>
<th>MATERIAL CATEGORY</th>
<th>EMISSIONS REQUIREMENT</th>
<th>MATERIALS WITH ADDED VOC REQUIREMENT</th>
<th>MATERIAL CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Office Furniture Systems and Seating</strong> installed prior to occupancy</td>
<td>ANSI/BIFMA X7.1: (95 percent of installed office furniture system workstations and seating units) Section 7.6.2 of ANSI/BIFMA e3: (50 percent of office furniture system workstations and seating units)</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td><strong>Ceiling and Wall Systems</strong> ceiling and wall insulation acoustical ceiling panels tackable wall panels gypsum wall board and panels wall coverings</td>
<td>CDPH/EHLB/Standard method V1.1 (California Section 01350): (Use &quot;office&quot; or &quot;classroom&quot; space limits for all applications)</td>
<td>none</td>
<td>none</td>
</tr>
</tbody>
</table>

-- End of Section --
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 SAFETY ENGINEERS (ASSE/SAFE)

<table>
<thead>
<tr>
<th>Reference</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASSE/SAFE A10.34</td>
<td>(2001; R 2012) Protection of the Public on or Adjacent to Construction Sites</td>
</tr>
<tr>
<td>ASSE/SAFE A10.44</td>
<td>(2014) Control of Energy Sources (Lockout/Tagout) for Construction and Demolition Operations</td>
</tr>
<tr>
<td>ASSE/SAFE Z244.1</td>
<td>(2003; R 2014) Control of Hazardous Energy Lockout/Tagout and Alternative Methods</td>
</tr>
<tr>
<td>ASSE/SAFE Z359.0</td>
<td>(2012) Definitions and Nomenclature Used for Fall Protection and Fall Arrest</td>
</tr>
<tr>
<td>ASSE/SAFE Z359.11</td>
<td>(2014) Safety Requirements for Full Body Harnesses</td>
</tr>
<tr>
<td>ASSE/SAFE Z359.12</td>
<td>(2009) Connecting Components for Personal Fall Arrest Systems</td>
</tr>
<tr>
<td>ASSE/SAFE Z359.13</td>
<td>(2013) Personal Energy Absorbers and Energy Absorbing Lanyards</td>
</tr>
<tr>
<td>ASSE/SAFE Z359.15</td>
<td>(2014) Safety Requirements for Single Anchor Lifelines and Fall Arresters for Personal Fall Arrest Systems</td>
</tr>
<tr>
<td>ASSE/SAFE Z359.2</td>
<td>(2007) Minimum Requirements for a Comprehensive Managed Fall Protection Program</td>
</tr>
<tr>
<td>ASSE/SAFE Z359.3</td>
<td>(2007) Safety Requirements for Positioning and Travel Restraint Systems</td>
</tr>
</tbody>
</table>
ASSE/SAFE Z359.6 (2009) Specifications and Design Requirements for Active Fall Protection Systems

ASSE/SAFE Z359.7 (2011) Qualification and Verification Testing of Fall Protection Products

ASME INTERNATIONAL (ASME)


ASME B30.22 (2016) Articulating Boom Cranes


ASME B30.3 (2016) Tower Cranes

ASME B30.5 (2014) Mobile and Locomotive Cranes

ASME B30.8 (2015) Floating Cranes and Floating Derricks


ASTM INTERNATIONAL (ASTM)


INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)


NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 10 (2018; TIA 18-1) Standard for Portable Fire Extinguishers


NFPA 51B (2014) Standard for Fire Prevention During Welding, Cutting, and Other Hot Work

NFPA 70 (2017; ERTA 1-2 2017; TIA 17-1; TIA 17-2; TIA 17-3; TIA 17-4; TIA 17-5; TIA 17-6; TIA 17-7; TIA 17-8; TIA 17-9; TIA 17-10; TIA 17-11; TIA 17-12; TIA 17-13; TIA 17-14) National Electrical Code
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 ASSE/SAFE 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 and include 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 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 through 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 requirements of EM 385-1-1 Appendix Q,
and ASSE/SAFE 2359.0, with 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 USACE Property and Equipment

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

1.2.17 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 using the Crane High Hazard working group mishap reporting form.

1.3 Submittals

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Architect's approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Accident Prevention Plan (APP); G
Contractor's Personnel Roster; G

SD-06 Test Reports

Monthly Exposure Reports
Notifications and Reports
Accident Reports; G
LHE Inspection Reports

SD-07 Certificates

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

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 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 SITE QUALIFICATIONS, DUTIES, AND MEETINGS

1.6.1 Personnel Qualifications

1.6.1.1 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 (1) 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.

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

The SSHO may not serve as the Quality Control Manager. The SSHO may not serve as the Superintendent.
1.6.1.2 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.

1.6.1.2.1 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.

1.6.1.2.2 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.

1.6.1.2.3 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.

1.6.1.2.3.1 Additional Personnel Requirements

1. All workers must be United States of America Citizens.

2. A roster of all workers must be submitted to Security for review before they are allowed on site.

3. Workers will be required to sign in and sign out of the job site.

1.6.1.3 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 (5) years. This is a certification class and must be attended 100 percent. In cases of emergency where an attendee cannot make it to a session, the attendee can make it up in another class session for the same subject.

c. Update training course materials whenever an update of the EM 385-1-1 becomes available.

d. Provide a written exam of at least 50 questions. Students are required to answer 80 percent correctly to pass.

e. Request, review and incorporate student feedback into a continuous course improvement program.

1.6.1.4 Crane Operators/Riggers


1.6.2 Personnel Duties

1.6.2.1 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 conference, 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 SSHO are subject to dismissal if the above duties are not being effectively carried out. If Superintendent, QC Manager, or SSHO are dismissed, project work will be stopped and will not be allowed to resume until a suitable replacement is approved and the above duties are again being effectively carried out.

1.6.3 Meetings

1.6.3.1 Preconstruction Conference

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

b. Discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference 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.

1.6.3.2 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 on 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.

1.7 ACCIDENT PREVENTION PLAN (APP)

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 (CHP). The SSHO must provide and maintain the APP and a log of signatures by each subcontractor foreman, attesting that they have read and understand the APP, and make the APP and log available on-site to the Contracting Officer. If English is not the foreman's primary language, the Prime Contractor must provide an interpreter.

Submit the APP to the Contracting Officer 15 calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP. Once reviewed and accepted by the Contracting Officer, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP is cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified. Continuously review and amend the APP, as necessary, throughout the life of the contract. Changes to the accepted APP must be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSHO and Quality Control Manager. Incorporate unusual or high-hazard activities not identified in the original APP as they are discovered. Should any severe hazard exposure (i.e. imminent danger) become evident, stop work in the area, secure the area, and develop a plan to remove the exposure and control the hazard. Notify the Contracting Officer within 24 hours of discovery. Eliminate and remove the hazard. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by ASSE/SAFE A10.34), and the environment.

1.7.1 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.

1.7.2 Plans

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

1.7.2.1 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.)

1.7.2.2 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 3 months.

1.7.2.3 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.

1.7.2.3.1 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.

1.7.2.3.2 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.

1.7.2.4 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.

1.7.2.5 Fall Protection and Prevention (FP&P) Plan

The plan must comply with the requirements of EM 385-1-1, Section 21.D and ASSE/SAFE 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).

1.7.2.6 Rescue and Evacuation Plan

Provide a Rescue and Evacuation Plan in accordance with EM 385-1-1 Section 21.N and ASSE/SAFE 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.

1.7.2.7 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, ASSE/SAFE Z244.1, and ASSE/SAFE 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.

1.7.2.8 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.
1.8 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 DFOW. The Government reserves the right to require the Contractor to revise and resubmit the AHA if it fails to effectively identify the work sequences, specific anticipated hazards, site conditions, equipment, materials, personnel and the control measures to be implemented.

AHAs must identify competent persons required for phases involving high risk activities, including confined entry, crane and rigging, excavations, trenching, electrical work, fall protection, and scaffolding.

1.8.1 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.

1.8.2 AHA Signature Log

Each employee performing work as part of an activity, task or DFOW must review the AHA for that work and sign a signature log specifically maintained for that AHA prior to starting work on that activity. The SSHO must maintain a signature log on site for every AHA. Provide employees whose primary language is other than English, with an interpreter to ensure a clear understanding of the AHA and its contents.

1.9 DISPLAY OF SAFETY INFORMATION

1.9.1 Safety Bulletin Board

Within one calendar day(s) after commencement of work, erect a safety bulletin board at the job site. Where size, duration, or logistics of project do not facilitate a bulletin board, an alternative method, acceptable to the Contracting Officer, that is accessible and includes all mandatory information for employee and visitor review, 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.

1.9.2 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.

1.10 SITE SAFETY REFERENCE MATERIALS

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

1.11 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.

1.12 NOTIFICATIONS and REPORTS

1.12.1 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 4 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.

1.12.2 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 USACE Accident Report Form 3394, and provide the report to the Contracting Officer within 5 calendar day(s) of the accident. The Contracting Officer will provide copies of any required or special forms.

b. Near Misses: For Army projects, report all "Near Misses" to the GDA, using local mishap reporting procedures, within 24 hrs. The Contracting Officer will provide the Contractor the required forms. 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.

1.12.3 LHE Inspection Reports

Submit LHE inspection reports required in accordance with EM 385-1-1 and as specified herein with Daily Reports of Inspections.

1.12.4 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.

1.13 HOT WORK

1.13.1 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 DPW. 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 DPW phone number. REPORT ANY FIRE, NO MATTER HOW SMALL, TO THE RESPONSIBLE IMMEDIATELY.

1.14 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.

1.14.1 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.

1.14.2 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.

1.14.3 Sewer Wet Wells

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

1.14.4 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.

1.15 SEVERE STORM PLAN

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

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

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

c. Ensure that temporary erosion controls are adequate.

PART 2  PRODUCTS

Not used.

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. An employee check-in/check-out communication procedure must be developed to ensure employee safety.

3.1.2 Hazardous Material Exclusions

Notwithstanding any other hazardous material used in this contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation (with the exception of radioactive material and devices used in accordance with 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.

3.1.3 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 15 days in advance. At a minimum, the written request must include the location of the outage, utilities being affected, duration of outage, any necessary sketches, and a description of the means to fulfill energy isolation requirements in accordance with EM 385-1-1, 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 HECP 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 Public Utilities representative. All parties must fully coordinate HEC activities with one another. During the coordination meeting, all parties must discuss and coordinate on the scope of work, HEC procedures (specifically, the lock-out/tag-out procedures for worker and utility protection), the AHA, assurance of trade personnel qualifications, identification of competent persons, and compliance with HECP training in accordance with EM 385-1-1, Section 12.C. Clarify when personal protective equipment is required during switching operations, inspection, and verification.

3.4 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)


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 ASSE/SAFE 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. 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 ASSE/SAFE 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.

3.5.2.1 Additional Personal Fall Protection

In addition to the required fall protection systems, other protection 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 Harnesses

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 carabiners 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. All full body harnesses must be equipped 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 of an edge, on a roof having a slope less than or equal to 4:12 (vertical to horizontal), protect personnel from falling by use of personal fall arrest/restraint systems, guardrails, or safety nets. A safety monitoring system is not adequate fall protection and is not authorized. Provide in accordance with 29 CFR 1926.500.

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

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 comply with the requirements of EM 385-1-1, ASSE/SAFE Z359.2, and ASSE/SAFE 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.
Contractor's operator must remain with the crane during the spot
check. Rigging gear must comply 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.

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.

3.8 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, Appendix A, 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 personnel 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.

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SECTION 01 42 00

SOURCES FOR REFERENCE PUBLICATIONS

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.

AACE INTERNATIONAL (AACE)
1265 Suncrest Towne Centre Drive
Morgantown, WV 26505-1876 USA
Ph: 304-296-8444
Fax: 304-291-5728
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Internet: http://www.ul.com/
UL Directories available through IHS at http://www.ihs.com

UNI-BELL PVC PIPE ASSOCIATION (UBPPA)
2711 LBJ Freeway, Suite 1000
Dallas, TX 75234
Ph: 972-243-3902
Fax: 972-243-3907
E-mail: info@uni-bell.org
Internet: http://www.uni-bell.org

WINDOW AND DOOR MANUFACTURERS ASSOCIATION (WDMA)
330 N Wabash Avenue, Suite 2000
Chicago, IL 60611
Ph: 312-321-6802
E-mail: wdma@wdma.com
Internet: http://www.wdma.com
PART 2  PRODUCTS

Not used

PART 3  EXECUTION

Not used

-- End of Section --
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 D3740 (2012a) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction


1.2 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program. Include all associated costs in the applicable Bid Schedule item.

1.3 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. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Contractor Quality Control (CQC) Plan; G

SD-06 Test Reports

Verification Statement

PART 2  PRODUCTS

Not Used
PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Establish and maintain an effective quality control (QC) system that complies with the Contract Clause titled "Inspection of Construction." QC consist of plans, procedures, and organization necessary to produce an end product which complies with the Contract requirements. The QC system covers all construction operations, both onsite and offsite, and be keyed to the proposed construction sequence. The project superintendent will be held responsible for the quality of work and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the Contract. In this context the highest level manager responsible for the overall construction activities at the site, including quality and production is the project superintendent. The project superintendent maintains a physical presence at the site at all times and is responsible for all construction and related activities at the site, except as otherwise acceptable to the Contracting Officer.

3.2 CONTRACTOR QUALITY CONTROL (CQC) PLAN

Submit no later than 15 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The Government will consider an interim plan for the first 30 days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional work.

3.2.1 Content of the CQC Plan

Include, as a minimum, the following to cover all construction-operations, both onsite and offsite, including work by subcontractors fabricators, suppliers and purchasing agents:

a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff will implement the three phase control system for all aspects of the work specified. Include a CQC System Manager that reports to the project superintendent.

b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.

c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the Contract. Letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities will be issued by the CQC System Manager. Furnish copies of these letters to the Contracting Officer.

d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures must be in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.
e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities approved by the Contracting Officer are required to be used.)

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

g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. Establish verification procedures that identified deficiencies have been corrected.

h. Reporting procedures, including proposed reporting formats.

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

j. 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. Where the applicable Code issue by the International Code Council (ICC) calls for inspections by the Building Official, the Contractor must include the inspections in the Quality Control Plan and must perform the inspections required by the applicable ICC. The Contractor must perform these inspections using independent qualified inspectors. Include the Special Inspection Plan requirements in the QC Plan.

3.2.2 Acceptance of Plan

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

3.2.3 Notification of Changes

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

3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and prior to acceptance by the Government of the CQC Plan, meet with the Contracting Officer and discuss the Contractor's quality control system. Submit the CQC Plan a minimum of 5 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details must be developed, including the forms for recording the CQC operations,
control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting will be prepared by the Government, signed by both the Contractor and the Contracting Officer and will become a part of the contract file. There can be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings or address deficiencies in the CQC system or procedures which can require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 Personnel Requirements

The requirements for the CQC organization are a Safety and Health Manager, CQC System Manager, and sufficient number of additional qualified personnel to ensure safety and Contract compliance. The Safety and Health Manager reports directly to a senior project (or corporate) official independent from the CQC System Manager. The Safety and Health Manager will also serve as a member of the CQC Staff Personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly will also be included as part of the CQC organization. The Contractor's CQC staff maintains a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure Contract compliance. The CQC staff will be subject to acceptance by the Contracting Officer. Provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Promptly complete and furnish all letters, material submittals, shop drawing submittals, schedules and all other project documentation to the CQC organization. The CQC organization is responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

3.4.2 CQC System Manager

Identify as CQC System Manager an individual within the onsite work organization that is responsible for overall management of CQC and has the authority to act in all CQC matters for the Contractor. The CQC System Manager is required to be a construction person with a minimum of ten years in related work. This CQC System Manager is on the site at all times during construction and is employed by the prime Contractor. The CQC System Manager is assigned no other duties. Identify in the plan an alternate to serve in the event of the CQC System Manager's absence. The requirements for the alternate are the same as the CQC System Manager.

3.4.3 CQC Personnel

In addition to CQC personnel specified elsewhere in the contract, provide as part of the CQC organization specialized personnel to assist the CQC System Manager for the following areas: electrical, mechanical, civil, communications. These individuals or specialized technical companies are employees of the prime or subcontractor; be responsible to the CQC System Manager; be physically present at the construction site during work on the specialized personnel's areas of responsibility; have the necessary education or experience in accordance with the experience matrix listed herein. These individuals can perform other duties but need to be allowed sufficient time to perform the specialized personnel's assigned quality control duties as described in the Quality Control Plan.
<table>
<thead>
<tr>
<th>Area</th>
<th>Qualifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil</td>
<td>Graduate Civil Engineer or Construction Manager with 2 years experience in the type of work being performed on this project or technician with 5 yrs related experience</td>
</tr>
<tr>
<td>Mechanical</td>
<td>Graduate Mechanical Engineer with 2 yrs experience or person with 5 years of experience supervising mechanical features of work in the field with a construction company</td>
</tr>
<tr>
<td>Electrical</td>
<td>Graduate Electrical Engineer with 2 years related experience or person 5 years of experience supervising electrical features of work in the field with a construction company</td>
</tr>
<tr>
<td>Communications</td>
<td>Graduate Communications Engineer with 2 years related experience or person 5 years of experience supervising communications features of work in the field with a construction company</td>
</tr>
<tr>
<td>Architectural</td>
<td>Graduate Architect with 2 years experience or person with 5 years related experience</td>
</tr>
<tr>
<td>Environmental</td>
<td>Graduate Environmental Engineer with 3 years experience</td>
</tr>
<tr>
<td>Submittals</td>
<td>Submittal Clerk with 1 year experience</td>
</tr>
<tr>
<td>Occupied Family Housing</td>
<td>Person, customer relations type, coordinator experience</td>
</tr>
<tr>
<td>Concrete, Pavements and Soils</td>
<td>Materials Technician with 2 years experience for the appropriate area</td>
</tr>
<tr>
<td>Testing, Adjusting and Balancing (TAB) Personnel</td>
<td>Specialist must be a member of AABC or an experienced technician of the firm certified by the NEBB</td>
</tr>
</tbody>
</table>
3.4.4 Additional Requirement

In addition to the above experience and education requirements, the Contractor Quality Control (CQC) System Manager and Alternate CQC System Manager are required to have completed the Construction Quality Management (CQM) for Contractors course. If the CQC System Manager does not have a current certification, obtain the CQM for Contractors course certification within 90 days of award. This course is periodically offered by the Naval Facilities Engineering Command and the Army Corps of Engineers. Contact the Contracting Officer for information on the next scheduled class.

The Construction Quality Management Training certificate expires after 5 years. If the CQC System Manager's certificate has expired, retake the course to remain current.

3.4.5 Organizational Changes

Maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

3.5 SUBMITTALS AND DELIVERABLES

Submittals, if needed, have to comply with the requirements in Section 01 33 00 SUBMITTAL PROCEDURES. The CQC organization is responsible for certifying that all submittals and deliverables are in compliance with the contract requirements. When Section 01 91 00.15 TOTAL BUILDING COMMISSIONING are included in the contract, the submittals required by those sections have to be coordinated with Section 01 33 00 SUBMITTAL PROCEDURES to ensure adequate time is allowed for each type of submittal required.

3.6 CONTROL

CQC is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control are required to be conducted by the CQC System Manager for each definable feature of the construction work as follows:

3.6.1 Preparatory Phase

This phase is performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase includes:

a. A review of each paragraph of applicable specifications, reference codes, and standards. Make available during the preparatory inspection a copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field. Maintain and make available in the field for use by Government personnel until final acceptance of the work.


c. Check to assure that all materials and equipment have been tested, submitted, and approved.

d. Review of provisions that have been made to provide required control
inspection and 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. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the Contract.

g. Examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

h. Review of the appropriate activity hazard analysis to assure safety requirements are met.

i. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.

j. Check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.

k. Discussion of the initial control phase.

l. The Government needs to be notified at least 24 hours in advance of beginning the preparatory control phase. Include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. Document the results of the preparatory phase actions by separate minutes prepared by the CQC System Manager and attach to the daily CQC report. Instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2 Initial Phase

This phase is accomplished at the beginning of a definable feature of work. Accomplish the following:

a. Check work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.

b. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing are in compliance with the contract.

c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

d. Resolve all differences.

e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.

f. The Government needs to be notified at least 24 hours in advance of beginning the initial phase for definable feature of work.
separate minutes of this phase by the CQC System Manager and attach to the daily CQC report. Indicate the exact location of initial phase for definable feature of work for future reference and comparison with follow-up phases.

g. The initial phase for each definable feature of work is repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

h. Coordinate scheduled work with Special Inspections required by Section 01 45 35 SPECIAL INSPECTIONS, the Statement of Special Inspections and the Schedule of Special Inspections.

3.6.3 Follow-up Phase

Perform daily checks to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. Record the checks in the CQC documentation. Conduct final follow-up checks and correct all deficiencies prior to the start of additional features of work which may be affected by the deficient work. Do not build upon nor conceal non-conforming work. 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.

3.6.4 Additional Preparatory and Initial Phases

Conduct additional preparatory and initial phases on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, onsite production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

3.7 TESTS

3.7.1 Testing Procedure

Perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and acceptance tests when specified. Procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site. Perform the following activities and record and provide the following data:

a. Verify that testing procedures comply with contract requirements.

b. Verify that facilities and testing equipment are available and comply with testing standards.

c. Check test instrument calibration data against certified standards.

d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

e. Record results of all tests taken, both passing and failing on the CQC report for the date taken. Specification paragraph reference, location
where tests were taken, and the sequential control number identifying the test. If approved by the Contracting Officer, actual test reports are submitted later with a reference to the test number and date taken. Provide an information copy of tests performed by an offsite or commercial test facility directly to the Contracting Officer. Failure to submit timely test reports as stated results in nonpayment for related work performed and disapproval of the test facility for this Contract.

3.7.2 Testing Laboratories

All testing laboratories must be validated by the USACE Material Testing Center (MTC) for the tests to be performed. Information on the USACE MTC with web-links to both a list of validated testing laboratories and for the laboratory inspection request for can be found at:

3.7.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel is required to meet criteria detailed in ASTM D3740 and ASTM E329.

3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge determined by the Contracting Officer's Representative to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the Contract amount due the Contractor.

3.7.3 Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.8 COMPLETION INSPECTION

3.8.1 Punch-Out Inspection

Conduct an inspection of the work by the CQC System Manager near the end of the work, or any increment of the work established by a time stated in the SPECIAL CONTRACT REQUIREMENTS Clause, "Commencement, Prosecution, and Completion of Work", or by the specifications. Prepare and include in the CQC documentation a punch list of items which do not conform to the approved drawings and specifications, as required by paragraph DOCUMENTATION. Include within the list of deficiencies the estimated date by which the deficiencies will be corrected. Make a second inspection the CQC System Manager or staff to ascertain that all deficiencies have been corrected. Once this is accomplished, notify the Government that the facility is ready for the Government Pre-Final inspection.

3.8.2 Pre-Final Inspection

The Government will perform the pre-final inspection to verify that the
facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. Ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection with the customer can be scheduled. Correct any items noted on the Pre-Final inspection in a timely manner. These inspections and any deficiency corrections required by this paragraph need to be accomplished within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative is required to be in attendance at the final acceptance inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups, and major commands can also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notify the Contracting Officer at least 14 days prior to the final acceptance inspection and include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the Contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the Contract clause titled "Inspection of Construction".

3.9 DOCUMENTATION

3.9.1 Quality Control Activities

Maintain current records providing factual evidence that required quality control activities and tests have been performed. Include in these records the work of subcontractors and suppliers on an acceptable form that includes, as a minimum, the following information:

a. The name and area of responsibility of the Contractor/Subcontractor.
b. Operating plant/equipment with hours worked, idle, or down for repair.
c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.
d. Test and control activities performed with results and references to specifications/drawings requirements. Identify the control phase (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action.
e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.
f. Submittals and deliverables reviewed, with Contract reference, by whom, and action taken.
g. Offsite surveillance activities, including actions taken.

h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

i. Instructions given/received and conflicts in plans and specifications.

3.9.2 Verification Statement

Indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. Cover both conforming and deficient features and include a statement that equipment and materials incorporated in the work and workmanship comply with the Contract. Furnish the original and one copy of these records in report form to the Government daily within 24 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, prepare and submit one report for every 7 days of no work and on the last day of a no work period. All calendar days need to be accounted for throughout the life of the contract. The first report following a day of no work will be for that day only. Reports need to be signed and dated by the Contractor Quality Control (CQC) System Manager. Include copies of test reports and copies of reports prepared by all subordinate quality control personnel within the CQC System Manager Report.

3.10 SAMPLE FORMS

Sample forms enclosed at the end of this section.

3.11 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. Take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, will be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer can issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders will be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

-- End of Section --
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SECTION 01 45 00.15 10

RESIDENT MANAGEMENT SYSTEM CONTRACTOR MODE (RMS CM)

11/16

PART 1 GENERAL

1.1 REFERENCES

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

U.S. ARMY CORPS OF ENGINEERS (USACE)


1.2 MEASUREMENT AND PAYMENT

The work of this section is not measured for payment. The Contractor is responsible for the work of this section, without any direct compensation other than the payment received for contract items.

1.3 CONTRACT ADMINISTRATION

The Government will use the Resident Management System (RMS) to assist in its monitoring and administration of this contract. The Government accesses the system using the Government Mode of RMS (RMS GM) and the Contractor accesses the system using the Contractor Mode (RMS CM). The term RMS will be used in the remainder of this section for both RMS GM and RMS CM. The joint Government-Contractor use of RMS facilitates electronic exchange of information and overall management of the contract. The Contractor accesses RMS to record, maintain, input, track, and electronically share information with the Government throughout the contract period in the following areas:

- Administration
- Finances
- Quality Control
- Submittal Monitoring
- Scheduling
- Closeout
- Import/Export of Data

1.3.1 Correspondence and Electronic Communications

For ease and speed of communications, exchange correspondence and other documents in electronic format to the maximum extent feasible. Some correspondence, including pay requests and payrolls, are also to be provided in paper format with original signatures. Paper documents will govern, in the event of discrepancy with the electronic version.

1.3.2 Other Factors

Other portions of this document have a direct relationship to the reporting accomplished through RMS. Particular attention is directed to FAR
52.236-15 Schedules for Construction Contracts; FAR 52.232-27 Prompt Payment for Construction Contracts; FAR 52.232-5 Payments Under Fixed-Priced Construction Contracts; Section 01 32 01.00 10 PROJECT SCHEDULE; Section 01 33 00 SUBMITTAL PROCEDURES; Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS; and Section 01 45 00.00 10 QUALITY CONTROL.

1.4 RMS SOFTWARE

RMS is a Windows-based program that can be run on a Windows-based PC meeting the requirements as specified in paragraph SYSTEM REQUIREMENTS. Download, install and be able to utilize the latest version of the RMS software within 7 calendar days of receipt of the Notice to Proceed. RMS software, user manuals, access and installation instructions, program updates and training information are available from the RMS website (http://rmsdocumentation.com). The Government and the Contractor will have different access authorities to the same contract database through RMS. The common database will be updated automatically each time a user finalizes an entry or change.

1.5 SYSTEM REQUIREMENTS

The following is the recommended system configuration to run the Contractor Mode RMS for full utilization of all features for all types and sizes of contracts. Smaller, less complicated, projects may not require the configuration levels described below. Required configuration also noted below.

<table>
<thead>
<tr>
<th>Recommended RMS System Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hardware</strong></td>
</tr>
<tr>
<td>Windows-based PC</td>
</tr>
<tr>
<td>RAM</td>
</tr>
<tr>
<td>Hard drive disk</td>
</tr>
<tr>
<td>Monitor</td>
</tr>
<tr>
<td>Mouse or other pointing device</td>
</tr>
<tr>
<td>Windows compatible printer</td>
</tr>
<tr>
<td>Connection to the Internet</td>
</tr>
<tr>
<td><strong>Software</strong></td>
</tr>
<tr>
<td>MS Windows</td>
</tr>
<tr>
<td>Word Processing software</td>
</tr>
<tr>
<td>E-mail</td>
</tr>
</tbody>
</table>
1.6 CONTRACT DATABASE - GOVERNMENT

The Government will enter the basic contract award data in RMS prior to granting the Contractor access. The Government entries into RMS will generally be related to submittal reviews, correspondence status, and Quality Assurance (QA) comments, as well as other miscellaneous administrative information.

1.7 CONTRACT DATABASE - CONTRACTOR

Contractor entries into RMS establish, maintain, and update data throughout the duration of the contract. Contractor entries generally include prime and subcontractor information, daily reports, submittals, RFI’s, schedule updates and payment requests. RMS includes the ability to import attachments and export reports in many of the modules, including submittals. The Contractor responsibilities for entries in RMS typically include the following items:

1.7.1 Administration

1.7.1.1 Contractor Information

Enter all current Contractor administrative data and information into RMS within 7 calendar days of receiving access to the contract in RMS. This includes, but is not limited to, Contractor's name, address, telephone numbers, management staff, and other required items.

1.7.1.2 Subcontractor Information

Enter all missing subcontractor administrative data and information into RMS CM within 7 calendar days of receiving access to the contract in RMS or within 7 calendar days of the signing of the subcontractor agreement for agreements signed at a later date. This includes name, trade, address, phone numbers, and other required information for all subcontractors. A subcontractor is listed separately for each trade to be performed.

1.7.1.3 Correspondence

Identify all Contractor correspondence to the Government with a serial number. Prefix correspondence initiated by the Contractor's site office with "S". Prefix letters initiated by the Contractor's home (main) office with "H". Letters are numbered starting from 0001. (e.g., H-0001 or S-0001). The Government's letters to the Contractor will be prefixed with "C" or "RFP".

1.7.1.4 Equipment

Enter and maintain a current list of equipment planned for use or being used on the jobsite, including the most recent and planned equipment inspection dates.
1.7.1.5 Reports

Track the status of the project utilizing the reports available in RMS. The value of these reports is reflective of the quality of the data input. These reports include the Progress Payment Request worksheet, Quality Control (QC) comments, Submittal Register Status, and Three-Phase Control worksheets.

1.7.1.6 Request For Information (RFI)

Create and track all Requests For Information (RFI) in the RMS Administration Module for Government review and response.

1.7.2 Finances

1.7.2.1 Pay Activity Data

Develop and enter a list of pay activities in conjunction with the project schedule. The sum of pay activities equals the total contract amount, including modifications. Each pay activity must be assigned to a Contract Line Item Number (CLIN). The sum of the activities assigned to a CLIN equals the amount of each CLIN.

1.7.2.2 Payment Requests

Prepare all progress payment requests using RMS. Update the work completed under the contract at least monthly, measured as percent or as specific quantities. After the update, generate a payment request and prompt payment certification using RMS. Submit the signed prompt payment certification and payment request as well as supporting data either electronically or by hard copy. Unless waived by the Contracting Officer, a signed paper copy of the approved payment certification and request is also required and will govern in the event of discrepancy with the electronic version.

1.7.3 Quality Control (QC)

Enter and track implementation of the 3-phase QC Control System, QC testing, transferred and installed property and warranties in RMS. Prepare daily reports, identify and track deficiencies, document progress of work, and support other Contractor QC requirements in RMS. Maintain all data on a daily basis. Insure that RMS reflects all quality control methods, tests and actions contained within the Contractor Quality Control (CQC) Plan and Government review comments of same within 7 calendar days of Government acceptance of the CQC Plan.

1.7.3.1 Quality Control (QC) Reports

The Contractor's Quality Control (QC) Daily Report in RMS is the official report. The Contractor can use other supplemental formats to record QC data, but information from any supplemental formats are to be consolidated and entered into the RMS QC Daily Report. Any supplemental information may be entered into RMS as an attachment to the report. QC Daily Reports must be finalized and signed in RMS within 24 hours after the date covered by the report. Provide the Government a printed signed copy of the QC Daily Report, unless waived by the Contracting Officer.
1.7.3.2 Deficiency Tracking.

Use the QC Daily Report Module to enter and track deficiencies. Deficiencies identified and entered into RMS by the Contractor or the Government will be sequentially numbered with a QC or QA prefix for tracking purposes. Enter each deficiency into RMS the same day that the deficiency is identified. Monitor, track and resolve all QC and QA entered deficiencies. A deficiency is not considered to be corrected until the Government indicates concurrence in RMS.

1.7.3.3 Three-Phase Control Meetings

Maintain scheduled and actual dates and times of preparatory and initial control meetings in RMS. Worksheets for the three-phase control meetings are generated within RMS.

1.7.3.4 Labor and Equipment Hours

Enter labor and equipment exposure hours on a daily basis. Roll up the labor and equipment exposure data into a monthly exposure report.

1.7.3.5 Accident/Safety Reporting

Both the Contractor and the Government enter safety related comments in RMS as a deficiency. The Contractor must monitor, track and show resolution for safety issues in the QC Daily Report area of the RMS QC Module. In addition, follow all reporting requirements for accidents and incidents as required in EM 385-1-1, Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS and as required by any other applicable Federal, State or local agencies.

1.7.3.6 Definable Features of Work

Enter each feature of work, as defined in the approved CQC Plan, into the RMS QC Module. A feature of work may be associated with a single or multiple pay activities, however a pay activity is only to be linked to a single feature of work.

1.7.3.7 Activity Hazard Analysis

Import activity hazard analysis electronic document files into the RMS QC Module utilizing the document package manager.

1.7.4 Submittal Management

Enter all current submittal register data and information into RMS within 7 calendar days of receiving access to the contract in RMS. The information shown on the submittal register following the specification Section 01 33 00 SUBMITTAL PROCEDURES will already be entered into the RMS database when access is granted. Group electronic submittal documents into transmittal packages to send to the Government, except very large electronic files, samples, spare parts, mock ups, color boards, or where hard copies are specifically required. Track transmittals and update the submittal register in RMS on a daily basis throughout the duration of the contract. Submit hard copies of all submittals unless waived by the Contracting Officer.

1.7.5 Schedule

Enter and update the contract project schedule in RMS by either manually
entering all schedule data or by importing the Standard Data Exchange Format (SDEF) file, based on the requirements in Section 01 32 01.00 13 PROJECT SCHEDULE.

1.7.6 Closeout

Closeout documents, processes and forms are managed and tracked in RMS by both the Contractor and the Government. Ensure that all closeout documents are entered, completed and documented within RMS.

1.8 IMPLEMENTATION

Use of RMS as described in the preceding paragraphs is mandatory. Ensure that sufficient resources are available to maintain contract data within the RMS system. RMS is an integral part of the Contractor's required management of quality control.

1.9 NOTIFICATION OF NONCOMPLIANCE

Take corrective action within 7 calendar days after receipt of notice of RMS non-compliance by the Contracting Officer.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --
CONTRACTOR'S QUALITY CONTROL REPORT (QCR)
(ER 1180-1-6)

**DATE:**

**REPORT NO.:**

**CONTRACT NUMBER AND NAME OF CONTRACTOR:**

**DESCRIPTION AND LOCATION OF THE WORK:**

<table>
<thead>
<tr>
<th>WEATHER CLASSIFICATION:</th>
<th>CLASSIFICATION:</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLASS A</td>
<td>CLASS A</td>
</tr>
<tr>
<td>No interruptions of any kind from weather conditions occurring on this or previous shifts.</td>
<td></td>
</tr>
<tr>
<td>CLASS B</td>
<td>CLASS B</td>
</tr>
<tr>
<td>Weather occurred during this shift that caused a complete stoppage of all work.</td>
<td></td>
</tr>
<tr>
<td>CLASS C</td>
<td>CLASS C</td>
</tr>
<tr>
<td>Weather occurred during this shift that caused a partial stoppage of work.</td>
<td></td>
</tr>
<tr>
<td>CLASS D</td>
<td>CLASS D</td>
</tr>
<tr>
<td>Weather overhead excellent or suitable during shift. Work completely stopped due to results of previous adverse weather.</td>
<td></td>
</tr>
<tr>
<td>CLASS E</td>
<td>CLASS E</td>
</tr>
<tr>
<td>Weather overhead excellent or suitable during shift but work partially stopped due to previous adverse manner.</td>
<td></td>
</tr>
<tr>
<td>OTHER</td>
<td>OTHER</td>
</tr>
<tr>
<td>Explain.</td>
<td></td>
</tr>
</tbody>
</table>

**WEATHER CLASSIFICATION:**

<table>
<thead>
<tr>
<th>CLASS</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLASS A</td>
<td>No interruptions of any kind from weather conditions occurring on this or previous shifts.</td>
</tr>
<tr>
<td>CLASS B</td>
<td>Weather occurred during this shift that caused a complete stoppage of all work.</td>
</tr>
<tr>
<td>CLASS C</td>
<td>Weather occurred during this shift that caused a partial stoppage of work.</td>
</tr>
<tr>
<td>CLASS D</td>
<td>Weather overhead excellent or suitable during shift. Work completely stopped due to results of previous adverse weather.</td>
</tr>
<tr>
<td>CLASS E</td>
<td>Weather overhead excellent or suitable during shift but work partially stopped due to previous adverse manner.</td>
</tr>
<tr>
<td>OTHER</td>
<td>Explain.</td>
</tr>
</tbody>
</table>

**CONTRACTOR/SUBCONTRACTORS AND AREA OF RESPONSIBILITY FOR WORK PERFORMED TODAY:**

(Attach list of items of equipment either idle or working as appropriate.)

1. WORK PERFORMED TODAY: (Indicate location and description of work performed. Refer to work performed by prime and/or subcontractors by letter in Table above.)

2. TYPE AND RESULTS OF INSPECTION: (Indicate whether: P - Preparatory, I - Initial, or F - Follow-up and include satisfactory work completed or deficiencies with action to be taken.)

3. TESTS REQUIRED BY PLANS AND/OR SPECIFICATIONS PERFORMED AND RESULTS OF TESTS:
4. VERBAL INSTRUCTIONS RECEIVED: (List any instructions given by Government personnel on construction deficiencies. retesting required, etc., with action to be taken.)

5. REMARKS: (Cover any conflicts in plans, specifications or instructions: acceptability of incoming materials: offsite surveillance activities; progress of work, delays, causes and extent thereof; days of no work with reasons for same.)

6. SAFETY: (Include any infractions of approved safety plan, safety manual or instructions from Government personnel. Specify corrective action taken.)

___ INSPECTOR ___

CONTRACTOR’S CERTIFICATION: I certify that the above report is complete and correct and that all material and equipment used, work performed and tests conducted during this reporting period were in strict compliance with the contract plans and specifications except as noted above.

___ CONTRACTOR’S APPROVED AUTHORIZED REPRESENTATIVE ___
PART 1   GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

INTERNATIONAL CODE COUNCIL (ICC)

U.S. DEPARTMENT OF DEFENSE (DOD)
UFC 3-310-04 (2013; with Change 1) Seismic Design for Buildings

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 random 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 third party inspector must not be company employee of the Contractor or any Sub-Contractor performing the work to be inspected.

1.3.8 Contracting Officer

The Government official having overall authority for administrative contracting actions. Certain contracting actions may be delegated to the Contracting Officer's Representative (COR).

1.3.9 Contractor's Quality Control (QC) Manager

An individual retained by the prime contractor and qualified in accordance with the contract documents and having the overall responsibility for the contractor's QC organization.

1.3.10 Designer of Record (DOR)

A registered design professional contracted by the Government as an A/E 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 state in which the design professional works. The DOR is also referred to as the Engineer of Record (EOR) in design code documents.

1.3.11 Statement of Special Inspections (SSI)

A document developed by the DOR identifying the material, systems, components and work required to have Special Inspections.

1.3.12 Schedule of Special Inspections

A schedule which lists each of the required Special Inspections, the extent to which each Special Inspections is to be performed, and the required frequency for each in accordance with ICC IBC Chapter 17.
1.3.13 Designated Seismic System

Those nonstructural components that require design in accordance with ASCE 7 Chapter 13 and for which the component importance factor, Ip, is greater than 1.0. This designation applies to systems that are required to be operational following the Design Earthquake for RC I - IV structures and following the MCER for RC V structures. All systems in RC V facilities designated as MC-1 in accordance with UFC 3-310-04 are considered part of the Designated Seismic Systems. Designated Seismic Systems will be identified by Owner and will have an Importance Factor Ip = 1.5.

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. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-06 Test Reports
   Special Inspections Daily Reports
   Special Inspections Biweekly Reports

SD-07 Certificates
   Fabrication Plant
   Steel Truss Plant
   Precast Concrete Institute (PCI) Certified Plant
   Certificate of Compliance
   Special Inspector Qualifications; G

SD-11 Closeout Submittals
   Comprehensive Final Report of Special Inspections; G

1.5 SPECIAL INSPECTOR QUALIFICATIONS

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

<table>
<thead>
<tr>
<th>Certification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AABC</td>
<td>Associated Air Balance Council</td>
</tr>
<tr>
<td>ACI</td>
<td>American Concrete Institute</td>
</tr>
<tr>
<td>AWCI</td>
<td>Association of the Wall and Ceiling Industry</td>
</tr>
<tr>
<td>AWS</td>
<td>American Welding Society</td>
</tr>
<tr>
<td>FM</td>
<td>Factory Mutual</td>
</tr>
<tr>
<td>ICC</td>
<td>International Code Council</td>
</tr>
<tr>
<td>NDT</td>
<td>Nondestructive Testing</td>
</tr>
<tr>
<td>NICET</td>
<td>National Institute for Certification in Engineering Technologies</td>
</tr>
<tr>
<td>PCI</td>
<td>Precast/Prestressed Concrete Institute</td>
</tr>
<tr>
<td>PTI</td>
<td>Post-Tensioning Institute</td>
</tr>
<tr>
<td>UL</td>
<td>Underwriters Laboratories</td>
</tr>
</tbody>
</table>

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 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 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. NICET Concrete Technician Level III Certificate in Construction Materials Testing, or
d. Registered Professional Engineer with 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 related experience

1.5.6.2  Associate Special Inspector

a. PCI Quality Control Technician/ Inspector Level I Certificate with one year of related experience, or
b. Engineer-In-Training with one year of related experience
1.5.7 Post-tensioned Concrete Construction

1.5.7.1 Special Inspector
   a. PTI Level 2 Unbonded PT Inspector Certificate, or
   b. Registered Professional Engineer with related experience

1.5.7.2 Associate Special Inspector
   a. PTI Level 1 Unbonded PT Inspector Certificate with one year of related experience, or
   b. Engineer-In-Training with one year of related experience

1.5.8 Masonry Construction

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

1.5.8.2 Associate Special Inspector
   Engineer-In-Training with one year of related experience.

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

1.5.9.1 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. NICET Geotechnical Engineering Technician Level II Construction or Generalist Certificate, or
   d. Geologist-In-Training with one year of related experience, or
   e. Registered Professional Engineer with 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
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 certifications to the Contracting Officer for information to allow work performed in the fabricator's shop to not be subjected to Special Inspections.

- American Institute of Steel Construction (AISC) Certified Fabrication Plant, Category STD.
- Truss Plate Institute (TPI) steel truss plant quality assurance program certification.
- 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 the construction documents.

PART 3 EXECUTION

3.1 RESPONSIBILITIES

3.1.1 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 DOR.
- e. Maintain a rework items list that includes discrepancies noted on the Special Inspectors daily report.

3.1.2 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.

- f. Submit a copy of the daily reports to the QC Manager.
g. 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.

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/or 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.

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.

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 --
STATEMENT OF SPECIAL INSPECTIONS
(Completed by the Registered Design Professional in Responsible Charge)

PROJECT: Secure Computing Facility
LOCATION: Engineer Research and Development Center
PERMIT APPLICANT: N/A
APPLICANT’S ADDRESS: TBD

ARCHITECT OF RECORD: TBD
STRUCTURAL ENGINEER OF RECORD: TBD
MECHANICAL ENGINEER OF RECORD: TBD
ELECTRICAL ENGINEER OF RECORD: TBD
REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE: TBD

This Statement of Special Inspections is submitted in accordance with Section 1704.3 of the 2015 International Building Code. It includes a Schedule of Special Inspection Services applicable to the above-referenced Project as well as the identity of the individuals, agencies, or firms intended to be retained for conducting these inspections. If applicable, it includes Requirements for Seismic Resistance and/or Requirements for Tornado Resistance.

Are Requirements for Seismic Resistance included in the Statement of Special Inspections? □ Yes ☒ No
Are Requirements for Tornado Resistance included in the Statement of Special Inspections? □ Yes ☒ No

The Special Inspector(s) shall keep records of all inspections and shall furnish interim inspection reports to the AHJ and to the Registered Design Professional in Responsible Charge at a frequency agreed upon by the Design Professional and the AHJ prior to the start of work. Discrepancies shall be brought to the immediate attention of the Contractor for correction. If the discrepancies are not corrected, the discrepancies shall be brought to the attention of the AHJ and the Registered Design Professional in Responsible Charge prior to completion of that phase of work. A Final Report of Special Inspections documenting required special inspections and corrections of any discrepancies noted in the inspections shall be submitted to the AHJ and the Registered Design Professional in Responsible Charge at the conclusion of the project.

Frequency of interim report submittals to the Registered Design Professional in Responsible Charge:

☐ Weekly ☐ Bi-Weekly ☐ Monthly ☐ Other; specify:________

The Special Inspection program does not relieve the Contractor of the responsibility to comply with the Contract Documents. Jobsite safety and means and methods of construction are solely the responsibility of the Contractor.

Statement of Special Inspections Prepared by:

Preparer’s Seal

Type or print name

Signature Date

AHJ Acceptance:

Signature Date

Permit Number:

Frequency of interim report submittals to the AHJ:

☐ Monthly ☐ Bi- Monthly ☐ Upon Completion ☐ Other; specify:________
This page was intentionally left blank for duplex printing.
<table>
<thead>
<tr>
<th>MATERIAL / ACTIVITY</th>
<th>SERVICE</th>
<th>Y/N</th>
<th>EXTENT</th>
<th>AGENT*</th>
<th>DATE COMPLETED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1704.2.5 Inspection of Fabricators</td>
<td>Verify fabrication/quality control procedures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>In-plant review (3)</td>
<td>Y</td>
<td>Periodic</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>1705.1.1 Special Cases</strong> (work unusual in nature, including but not limited to alternative construction materials, unusual design applications, systems or materials with special manufacturer requirements. Attach 8 1/2x11 if needed).</td>
<td>Submittal review, shop(3) inspection and/or field inspection.</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>1705.2 Structural Steel Construction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Review the material test reports and certificates as listed in AISC 360-10, Section N3.2 for compliance with the construction documents</td>
<td>Submittal review</td>
<td>Y</td>
<td>Each submittal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Material verification of structural steel</td>
<td>Shop (3) and field inspection</td>
<td>Y</td>
<td>Periodic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Anchor Rods and other Embedment(s) (Verify diameter, grade, type, length, embedment. See 1705.3 for anchors)</td>
<td>Field inspection</td>
<td>Y</td>
<td>Continuous</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Verify member locations, braces, stiffeners, and application of joint details at each connection comply with construction documents</td>
<td>Field inspection</td>
<td>Y</td>
<td>Periodic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATERIAL / ACTIVITY</td>
<td>SERVICE</td>
<td>APPLICABLE TO THIS PROJECT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>---------</td>
<td>---------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Structural steel welding:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Inspection tasks Prior to Welding (Observe, or perform for each welded joint or member, the QA tasks listed in AISC 360, Table N5.4-1)</td>
<td>Shop (3) and field inspection</td>
<td>Observe or Perform as noted (4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Inspection tasks During Welding (Observe, or perform for each welded joint or member, the QA tasks listed in AISC 360, Table N5.4-2)</td>
<td>Shop (3) and field inspection</td>
<td>Observe (4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Inspection tasks After Welding (Observe, or perform for each welded joint or member, the QA tasks listed in AISC 360, Table N5.4-3)</td>
<td>Shop (3) and field inspection</td>
<td>Observe or Perform as noted (4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Nondestructive testing (NDT) of welded joints: see Commentary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Complete penetration groove welds at joints in materials 5/16&quot; thick or greater in Risk Category III or IV</td>
<td>Shop (3) or field ultrasonic testing - 100%</td>
<td>Periodic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Complete penetration groove welds at joints in materials 5/16&quot; or greater in Risk Category II</td>
<td>Shop (3) or field ultrasonic testing - 10% of welds minimum</td>
<td>Periodic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Thermally cut surfaces of access holes when material t &gt; 2&quot;</td>
<td>Shop (3) or field magnetic Particle or Penetrant testing</td>
<td>Periodic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATERIAL / ACTIVITY</td>
<td>SERVICE</td>
<td>Y/N</td>
<td>EXTENT</td>
<td>AGENT*</td>
<td>DATE COMPLETED</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------</td>
<td>-----</td>
<td>----------------</td>
<td>--------</td>
<td>----------------</td>
</tr>
<tr>
<td>4) Welded joints subject to fatigue when required by AISC 360, Appendix 3, Table A-3.1</td>
<td>Shop (3) or field radiographic or Ultrasonic testing</td>
<td>N</td>
<td>Periodic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5) Fabricator's NDT reports when fabricator performs NDT</td>
<td>Verify reports</td>
<td>N</td>
<td>Each submittal (5)</td>
<td></td>
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</tr>
<tr>
<td>6. Structural steel bolting:</td>
<td>Shop (3) and field inspection</td>
<td>Y</td>
<td>Observe or Perform as noted (4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Inspection tasks Prior to Bolting (Observe, or perform tasks for each bolted connection, in accordance with QA tasks listed in AISC 360-10, Table N5.6-1)</td>
<td>Observe or Perform as noted (4)</td>
<td>Y</td>
<td>Observe (4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Inspection tasks During Bolting (Observe the QA tasks listed in AISC 360-10, Table N5.6-2)</td>
<td>Observe (4)</td>
<td>Y</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1) Pre-tensioned and slip-critical joints</td>
<td></td>
<td>Y</td>
<td>Periodic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Turn-of-nut with matching markings</td>
<td></td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Direct tension indicator</td>
<td></td>
<td>Y</td>
<td>Periodic</td>
<td></td>
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</tr>
<tr>
<td>c) Twist-off type tension control bolt</td>
<td></td>
<td>Y</td>
<td>Periodic</td>
<td></td>
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</tr>
<tr>
<td>d) Turn-of-nut without matching markings</td>
<td></td>
<td>Y</td>
<td>Continuous</td>
<td></td>
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<tr>
<td>e) Calibrated wrench</td>
<td></td>
<td>Y</td>
<td>Continuous</td>
<td></td>
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<tr>
<td>2) Snug-tight joints</td>
<td></td>
<td>Y</td>
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<td>MATERIAL / ACTIVITY</td>
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<td></td>
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</tr>
<tr>
<td>c. Inspection tasks After Bolting</td>
<td>Perform (4)</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Perform tasks for each bolted connection in accordance with QA tasks listed in AISC 360, Table N5.6-3)</td>
<td></td>
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<tr>
<td>7. Inspection of steel elements of composite construction prior to concrete placement in accordance with QA tasks listed in AISC 360-10, Table N6.1 and Section N6</td>
<td>Shop (3) and field inspection and testing</td>
<td>N</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>a. Placement and installation of steel deck</td>
<td>Periodic</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Placement and installation of steel headed stud anchors</td>
<td>Periodic</td>
<td>N</td>
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</tbody>
</table>

1705.2.2 Steel Construction Other Than Structural Steel

1. Material verification of cold-formed steel deck:
   
   a. Identification markings | Field inspection | Y | Periodic |
   b. Manufacturer's certified test reports | Submittal Review | Y | Each submittal |

2. Connection of cold-formed steel deck to supporting structure:
   
   a. Welding | Periodic | |
   b. Other fasteners (in accordance with AISC 360, Section N6) | | Y |
   1) Verify fasteners are in conformance with approved submittal | Periodic | Y |
## SCHEDULE OF SPECIAL INSPECTION SERVICES

**PROJECT**
(Completed by the Registered Design Professional in Responsible Charge)

<table>
<thead>
<tr>
<th>MATERIAL / ACTIVITY</th>
<th>SERVICE</th>
<th>Y/N</th>
<th>EXTENT</th>
<th>AGENT*</th>
<th>DATE COMPLETED</th>
</tr>
</thead>
<tbody>
<tr>
<td>2) Verify fastener installation is in conformance with approved submittal and manufacturer’s recommendations</td>
<td>Field inspection</td>
<td>Y</td>
<td>Periodic</td>
<td></td>
<td></td>
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<tr>
<td>3. Welding reinforcing steel</td>
<td>Shop (3) and field inspection</td>
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<td></td>
</tr>
<tr>
<td>a. Verification of weldability of steel other than ASTM A706</td>
<td></td>
<td>N</td>
<td>Periodic</td>
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<td></td>
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<tr>
<td>b. Reinforcing steel resisting flexural and axial forces in intermediate and special moment frames, boundary elements of special concrete structural walls and shear reinforcement</td>
<td></td>
<td>N</td>
<td>Continuous</td>
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<tr>
<td>c. Shear reinforcement</td>
<td></td>
<td>N</td>
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<tr>
<td>d. Other reinforcing steel</td>
<td></td>
<td>N</td>
<td>Periodic</td>
<td></td>
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<tr>
<td>4. Cold-formed steel trusses spanning 60 feet or greater</td>
<td></td>
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</tr>
<tr>
<td>a. Verify temporary and permanent restraint/bracing are installed in accordance with the approved truss submittal package</td>
<td>Field inspection</td>
<td>N</td>
<td>Periodic</td>
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### 1705.3 Concrete Construction

<table>
<thead>
<tr>
<th>SERVICE</th>
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<tbody>
<tr>
<td>1. Inspection of reinforcing steel placement</td>
<td>Field inspection</td>
<td>Y</td>
<td>Periodic</td>
<td></td>
</tr>
<tr>
<td>2. Inspection of prestressing steel placement</td>
<td>In-plant or field review</td>
<td>N</td>
<td>Periodic</td>
<td></td>
</tr>
<tr>
<td>3. Inspection of anchors cast in concrete where allowable loads have been increased or where strength design is used</td>
<td>Shop (3) and field inspection</td>
<td>N</td>
<td>Continuous</td>
<td></td>
</tr>
<tr>
<td>MATERIAL / ACTIVITY</td>
<td>SERVICE</td>
<td>Y/N</td>
<td>EXTENT</td>
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</tr>
<tr>
<td>4. Inspection of anchors and reinforcing steel post-installed in hardened concrete: Per research reports requirements</td>
<td>Field inspection</td>
<td>Y</td>
<td>Periodic or as required by the research report issued by an approved source</td>
<td></td>
</tr>
<tr>
<td>5. Verify use of approved design mix</td>
<td>Shop (3) and field inspection</td>
<td>Y</td>
<td>Periodic</td>
<td></td>
</tr>
<tr>
<td>6. Fresh concrete sampling, perform slump and air content tests and determine temperature of concrete</td>
<td>Shop (3) and field inspection</td>
<td>Y</td>
<td>Continuous</td>
<td></td>
</tr>
<tr>
<td>7. Inspection of concrete and shotcrete placement for proper application techniques</td>
<td>Shop (3) and field inspection</td>
<td>Y</td>
<td>Continuous</td>
<td></td>
</tr>
<tr>
<td>8. Inspection for maintenance of specified curing temperature and techniques</td>
<td>Shop (3) and field inspection</td>
<td>Y</td>
<td>Periodic</td>
<td></td>
</tr>
<tr>
<td>9. Inspection of prestressed concrete:</td>
<td>In-plant or field review</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Application of prestressing forces</td>
<td>Y</td>
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<td>Continuous</td>
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<tr>
<td>b. Grouting of bonded prestressing tendons in the seismic-force-resisting system</td>
<td>Y</td>
<td></td>
<td>Continuous</td>
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<tr>
<td>10. Erection of precast concrete members</td>
<td></td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Inspect in accordance with construction documents</td>
<td>Field inspection</td>
<td>Y</td>
<td>Periodic</td>
<td></td>
</tr>
<tr>
<td>b. Perform inspections of welding and bolting in accordance with Section 1705.2</td>
<td>Field inspection</td>
<td>Y</td>
<td>In accordance with Section 1705.2</td>
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</table>
# SCHEDULE OF SPECIAL INSPECTION SERVICES

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</tr>
</thead>
<tbody>
<tr>
<td>11. Verification of 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.</td>
<td>Field testing and review of laboratory reports</td>
<td>Y</td>
<td>Periodic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Inspection of formwork for shape, lines, location and dimensions</td>
<td>Field inspection</td>
<td>Y</td>
<td>Periodic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Concrete strength testing and verification of compliance with construction documents</td>
<td>Field testing and review of laboratory reports</td>
<td>Y</td>
<td>Periodic</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**1705.4 Masonry Construction**

**(A) Level A, B and C Quality Assurance:**

1. Verify compliance with approved submittals | Field Inspection | Y | Periodic | |

**(B) Level B Quality Assurance:**

1. Verification of \( f_m \) and \( f_{AAC} \) prior to construction | Testing by unit strength method or prism test method | N | Periodic | |

**(C) Level C Quality Assurance:**

1. Verification of \( f_m \) and \( f_{AAC} \) prior to construction and for every 5,000 SF during construction | Testing by unit strength method or prism test method | N | Periodic | |
2. Verification of proportions of materials in premixed or preblended mortar, prestressing grout, and grout other than selfconsolidating grout, as delivered to the project site | Field inspection | N | Continuous | |
3. Verify placement of masonry units | Field Inspection | N | Periodic | |
<table>
<thead>
<tr>
<th>MATERIAL / ACTIVITY</th>
<th>SERVICE</th>
<th>Y/N</th>
<th>EXTENT</th>
<th>AGENT*</th>
<th>DATE COMPLETED</th>
</tr>
</thead>
<tbody>
<tr>
<td>(D) Levels B and C Quality Assurance:</td>
<td></td>
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</tr>
<tr>
<td>1. Verification of Slump Flow and Visual Stability Index (VSI) of selfconsolidating grout as delivered to the project</td>
<td>Field testing</td>
<td>N</td>
<td>Continuous</td>
<td></td>
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</tr>
<tr>
<td>2. Verify compliance with approved submittals</td>
<td>Field inspection</td>
<td>N</td>
<td>Periodic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Verify proportions of site-mixed mortar, grout and prestressing grout for bonded tendons</td>
<td>Field Inspection</td>
<td>N</td>
<td>Periodic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Verify grade, type, and size of reinforcement and anchor bolts, and prestressing tendons and anchorages</td>
<td>Field Inspection</td>
<td>N</td>
<td>Periodic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Verify construction of mortar joints</td>
<td>Field Inspection</td>
<td>N</td>
<td>Periodic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Verify placement of reinforcement, connectors, and prestressing tendons and anchorages</td>
<td>Field Inspection</td>
<td>N</td>
<td>Level B - Periodic</td>
<td>Level C - Continuous</td>
<td></td>
</tr>
<tr>
<td>7. Verify grout space prior to grouting</td>
<td>Field Inspection</td>
<td>N</td>
<td>Level B - Periodic</td>
<td>Level C - Continuous</td>
<td></td>
</tr>
<tr>
<td>8. Verify placement of grout and prestressing grout for bonded tendons</td>
<td>Field Inspection</td>
<td>N</td>
<td>Continuous</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Verify size and location of structural masonry elements</td>
<td>Field Inspection</td>
<td>N</td>
<td>Periodic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Verify type, size, and location of anchors, including details of anchorage of masonry to structural members, frames, or other construction.</td>
<td>Field inspection</td>
<td>N</td>
<td>Level B - Periodic</td>
<td>Level C - Continuous</td>
<td></td>
</tr>
<tr>
<td>MATERIAL / ACTIVITY</td>
<td>SERVICE</td>
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</tr>
<tr>
<td>11. Verify welding of reinforcement (see 1705.2.2)</td>
<td>Field inspection</td>
<td>N</td>
<td>Continuous</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Verify preparation, construction, and protection of masonry during cold weather (temperature below 40°F) or hot weather (temperature above 90°F)</td>
<td>Field inspection</td>
<td>N</td>
<td>Periodic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Verify application and measurement of prestressing force</td>
<td>Field Inspection</td>
<td>N</td>
<td>Continuous</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Verify placement of AAC masonry units and construction of thin-bed mortar joints (first 5000 SF of AAC masonry)</td>
<td>Field inspection</td>
<td>N</td>
<td>Continuous</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Verify placement of AAC masonry units and construction of thin-bed mortar joints (after the first 5000 SF of AAC masonry)</td>
<td>Field inspection</td>
<td>N</td>
<td>Level B - Periodic</td>
<td></td>
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<tr>
<td>16. Verify properties of thin-bed mortar for AAC masonry (first 5000 SF of AAC masonry)</td>
<td>Field inspection</td>
<td>N</td>
<td>Level C - Continuous</td>
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<tr>
<td>17. Verify properties of thin-bed mortar for AAC masonry (after the first 5000 SF of AAC masonry)</td>
<td>Field inspection</td>
<td>N</td>
<td>Level B - Periodic</td>
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<tr>
<td>18. Prepare grout and mortar specimens</td>
<td>Field testing</td>
<td>N</td>
<td>Level B - Periodic</td>
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<tr>
<td>19. Observe preparation of prisms</td>
<td>Field inspection</td>
<td>N</td>
<td>Level C - Continuous</td>
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1705.5 Wood Construction
<table>
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</thead>
<tbody>
<tr>
<td>1. Inspection of the fabrication process of wood structural elements and assemblies in accordance with Section 1704.2.5</td>
<td>In-plant review (3)</td>
<td>N Periodic</td>
</tr>
<tr>
<td>2. For high-load diaphragms, verification of grade and thickness of structural panel sheathing.</td>
<td>Field inspection</td>
<td>N Periodic</td>
</tr>
<tr>
<td>3. For high-load diaphragms, verify nominal size of framing members at adjoining panel edges, nail or staple diameter and length, number of fastener lines, and that spacing between fasteners in each line and at edge margins agrees with approved bldg plans.</td>
<td>Field inspection</td>
<td>N Periodic</td>
</tr>
<tr>
<td>4. Metal-plate-connected wood trusses spanning 60 feet or greater: verify temporary and permanent restraint/bracing are installed in accordance with the approved truss submittal package</td>
<td>Field inspection</td>
<td>N Periodic</td>
</tr>
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</table>

**1705.6 Soils**

<table>
<thead>
<tr>
<th>SERVICE</th>
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</thead>
<tbody>
<tr>
<td>Field inspection</td>
<td>Y Periodic</td>
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<tr>
<td>Field inspection</td>
<td>Y Periodic</td>
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<tr>
<td>MATERIAL / ACTIVITY</td>
<td>SERVICE</td>
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</tr>
<tr>
<td>4. Verify use of proper materials, densities, and lift thicknesses during placement and compaction of compacted fill</td>
<td>Field inspection</td>
</tr>
<tr>
<td>5. Prior to placement of controlled fill, observe subgrade and verify that site has been prepared properly</td>
<td>Field inspection</td>
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<td>MATERIAL / ACTIVITY</td>
<td>SERVICE</td>
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<tr>
<td>1705.7 Driven Deep Foundations</td>
<td></td>
</tr>
<tr>
<td>1. Verify element materials, sizes and lengths comply with requirements</td>
<td>Field inspection</td>
</tr>
<tr>
<td>2. Determine capacities of test elements and conduct additional load tests, as required</td>
<td>Field inspection</td>
</tr>
<tr>
<td>3. Observe driving operations and maintain complete and accurate records for each element</td>
<td>Field inspection</td>
</tr>
<tr>
<td>4. 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</td>
<td>Field inspection</td>
</tr>
<tr>
<td>5. For steel elements, perform additional inspections per Section 1705.2</td>
<td>See Section 1705.2</td>
</tr>
<tr>
<td>6. For concrete elements and concrete-filled elements, perform additional inspections per Section 1705.3</td>
<td>See Section 1705.3</td>
</tr>
<tr>
<td>7. For specialty elements, perform additional inspections as determined by the registered design professional in responsible charge</td>
<td>Field inspection</td>
</tr>
<tr>
<td>MATERIAL / ACTIVITY</td>
<td>SERVICE</td>
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</tr>
<tr>
<td>1705.8 Cast-in-Place Deep Foundations</td>
<td></td>
</tr>
<tr>
<td>1. Observe drilling operations and maintain complete and accurate records for each element</td>
<td>Field inspection</td>
</tr>
<tr>
<td>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</td>
<td>Field inspection</td>
</tr>
<tr>
<td>3. For concrete elements, perform additional inspections in accordance with Section 1705.3</td>
<td>See Section 1705.3</td>
</tr>
<tr>
<td>1705.9 Helical Pile Foundations</td>
<td></td>
</tr>
<tr>
<td>1. Verify installation equipment, pile dimensions, tip elevations, final depth, final installation torque and other data as required</td>
<td>Field inspection</td>
</tr>
<tr>
<td>2. Perform additional inspections and tests in accordance with the construction documents</td>
<td>Field Inspection and testing</td>
</tr>
<tr>
<td>1705.10.1 Structural Wood Special Inspections For Tornado Resistance</td>
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<td>SERVICE</td>
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</tr>
<tr>
<td>2. Inspection of nailing, bolting, anchoring and other fastening of components within the main windforce-resisting system</td>
<td>Shop (3) and field inspection</td>
</tr>
<tr>
<td>1705.10.2 Cold-formed Steel Special Inspections For Wind Resistance</td>
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</tr>
<tr>
<td>1. Inspection during welding operations of elements of the main windforce-resisting system</td>
<td>Shop (3) and field inspection</td>
</tr>
<tr>
<td>2. Inspections for screw attachment, bolting, anchoring and other fastening of components within the main windforce-resisting system</td>
<td>Shop (3) and field inspection</td>
</tr>
<tr>
<td>1705.10.3 Wind-resisting Components</td>
<td></td>
</tr>
<tr>
<td>1. Roof cladding</td>
<td>Shop (3) and field inspection</td>
</tr>
<tr>
<td>2. Wall cladding</td>
<td>Shop (3) and field inspection</td>
</tr>
</tbody>
</table>
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<tbody>
<tr>
<td><strong>1705.11.1 Structural Steel</strong></td>
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</tr>
<tr>
<td>Special Inspections for Seismic Resistance</td>
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</tr>
<tr>
<td>1. Fabricator and erector documents</td>
<td>Submittal Review</td>
<td>Each submittal</td>
</tr>
<tr>
<td>(Verify reports and certificates as listed in AISC 341-10, Section J2 for compliance with construction documents)</td>
<td></td>
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</tr>
<tr>
<td>2. Structural steel welding:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Inspection tasks Prior to, During and After Welding (Observe, or perform for each welded joint or member, the QA tasks listed in AISC 341-10, Table J6-1, J6-2 &amp; J6-3)</td>
<td>Shop (3) and field inspection</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Observe or Perform as noted (4)</td>
</tr>
<tr>
<td>b. Nondestructive testing (NDT) of welded joints in accordance with AISC 341-10, Section J6.2.</td>
<td>Shop (3) and field testing</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Periodic</td>
</tr>
<tr>
<td>3. Structural steel bolting:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Inspection tasks Prior to, During and After Bolting (Observe, or perform tasks for each bolted connection, in accordance with QA tasks listed in AISC 341-10, Table J7-1, J7-2 &amp; J7-3)</td>
<td>Shop (3) and field inspection</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Observe or Perform as noted (4)</td>
</tr>
<tr>
<td>4. Other Steel Structure Inspections, in accordance with QA tasks listed in AISC 341-10, Table J8-1:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. RBS requirements</td>
<td>Shop (3) and field inspection</td>
<td>N</td>
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<tr>
<td></td>
<td></td>
<td>Observe (4)</td>
</tr>
<tr>
<td>b. Protected zones</td>
<td>Shop (3) and field inspection</td>
<td>N</td>
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<td></td>
<td></td>
<td>Observe (4)</td>
</tr>
<tr>
<td>MATERIAL / ACTIVITY</td>
<td>SERVICE</td>
<td>Y/N</td>
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</tr>
<tr>
<td>5. Composite construction:</td>
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</tr>
<tr>
<td>a. Inspection tasks Prior to, During and After Concrete Placement (Observe, or perform tasks, in accordance with QA tasks listed in AISC 341-10, Table J9-1, J9-2 &amp; J9-3)</td>
<td>Field inspection</td>
<td>N</td>
</tr>
<tr>
<td>1705.11.2 Structural Wood Special Inspections for Seismic Resistance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Inspection of field gluing operations of elements of the seismic-force resisting system</td>
<td>Field inspection</td>
<td>N</td>
</tr>
<tr>
<td>2. Inspection of nailing, bolting, anchoring and other fastening of components within the seismic-force-resisting system</td>
<td>Shop (3) and field inspection</td>
<td>N</td>
</tr>
<tr>
<td>1705.11.3 Cold-formed Steel Light-Frame Construction Special Inspections for Seismic Resistance</td>
<td></td>
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</tr>
<tr>
<td>1. Inspection during welding operations of elements of the seismic force-resisting system</td>
<td>Shop (3) and field inspection</td>
<td>N</td>
</tr>
<tr>
<td>2. Inspections for screw attachment, bolting, anchoring and other fastening of components within the seismic force-resisting system</td>
<td>Shop (3) and field inspection</td>
<td>N</td>
</tr>
<tr>
<td>MATERIAL / ACTIVITY</td>
<td>SERVICE</td>
<td>Y/N</td>
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<tr>
<td>---------------------</td>
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</tr>
<tr>
<td>1705.11.4 Designated Seismic System Verification</td>
<td>Field inspection</td>
<td></td>
</tr>
<tr>
<td>Inspect and verify that the component label, anchorage or mounting conforms to the certificate of compliance in accordance with 1705.12.3</td>
<td></td>
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</tr>
<tr>
<td>1. Architectural Designated Seismic Systems (per ASCE 7-10)</td>
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</tr>
<tr>
<td>a. Interior non-structural partition walls and connections</td>
<td>Field Inspection</td>
<td>Det. By Owner</td>
</tr>
<tr>
<td>b. Parapets</td>
<td>Field Inspection</td>
<td></td>
</tr>
<tr>
<td>c. Chimneys</td>
<td>Field Inspection</td>
<td></td>
</tr>
<tr>
<td>d. Exterior non-structural walls elements and connections</td>
<td>Field Inspection</td>
<td></td>
</tr>
<tr>
<td>e. Veneer</td>
<td>Field Inspection</td>
<td></td>
</tr>
<tr>
<td>f. Suspended Ceiling Systems</td>
<td>Field Inspection</td>
<td></td>
</tr>
<tr>
<td>g. Cabinets</td>
<td>Field Inspection</td>
<td></td>
</tr>
<tr>
<td>h. Storefront and curtainwall framing</td>
<td>Field Inspection</td>
<td></td>
</tr>
<tr>
<td>i. Access Floors</td>
<td>Field Inspections</td>
<td></td>
</tr>
<tr>
<td>j. Glass in glazed interior and exterior storefront and curtainwall systems</td>
<td>Field Inspection</td>
<td></td>
</tr>
<tr>
<td>k. Laboratory Equipment</td>
<td>Field Inspection</td>
<td></td>
</tr>
<tr>
<td>2. Mechanical &amp; Electrical Designated Seismic Systems (per ASCE 7-10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Mechanical and Electrical Components</td>
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</tr>
<tr>
<td>MATERIAL / ACTIVITY</td>
<td>SERVICE</td>
<td>Y/N</td>
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<tr>
<td>-----------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>1) Air-side HVAC fans, air handlers, air conditioning units, air distribution boxes, and other mechanical components constructed of sheet metal</td>
<td>Field Inspection</td>
<td></td>
</tr>
<tr>
<td>2) Wet side HVAC, boilers, furnaces, atmospheric tanks and bins, chillers, water heaters, heat exchangers, air separators, manufacturing or process equipment and other mechanical components constructed of high-deformability materials</td>
<td>Field Inspection</td>
<td></td>
</tr>
<tr>
<td>3) Engines, turbines, pumps, compressors, and pressure vessels</td>
<td>Field Inspection</td>
<td></td>
</tr>
<tr>
<td>4) Elevator and escalator components</td>
<td>Field Inspection</td>
<td></td>
</tr>
<tr>
<td>5) Generators, batteries, invertors, motors, transformers, and other electrical components constructed of high deformability materials</td>
<td>Field Inspection</td>
<td></td>
</tr>
<tr>
<td>6) Motor control centers, panel boards, switch gear, instrumentation cabinets, and other components constructed of sheet metal framing</td>
<td>Field Inspection</td>
<td></td>
</tr>
<tr>
<td>7) Communication equipment, computers, instrumentation and controls</td>
<td>Field Inspection</td>
<td></td>
</tr>
<tr>
<td>8) Roof mounted stacks, cooling and electrical towers</td>
<td>Field Inspection</td>
<td></td>
</tr>
<tr>
<td>9) Light fixtures</td>
<td>Field Inspection</td>
<td></td>
</tr>
</tbody>
</table>
### SCHEDULE OF SPECIAL INSPECTION SERVICES

**PROJECT**

(Completed by the Registered Design Professional in Responsible Charge)

<table>
<thead>
<tr>
<th>MATERIAL / ACTIVITY</th>
<th>SERVICE</th>
<th>Y/N</th>
<th>EXTENT</th>
<th>AGENT*</th>
<th>DATE COMPLETED</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. Vibration Isolated Components &amp; Systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Components and systems isolated using neoprene elements and neoprene isolated floors with built-in or separate elastomeric snubbing devices or resilient perimeter stops</td>
<td>Field Inspection</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2) Spring isolated components and systems closely restrained using built in or separate elastomeric snubbing devices or resilient perimeter stops</td>
<td>Field Inspection</td>
<td></td>
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<td></td>
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<tr>
<td>3) Internally isolated systems and supports</td>
<td>Field Inspection</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>4) Suspended vibration isolation equipment including in-line duct devices and suspended internally isolated components</td>
<td>Field Inspection</td>
<td></td>
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<tr>
<td>c. Distribution Systems</td>
<td></td>
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</tr>
<tr>
<td>1) Piping and tubing including in-line components</td>
<td>Field Inspection</td>
<td></td>
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<tr>
<td>2) Ductwork, including in-line components</td>
<td>Field Inspection</td>
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<tr>
<td>3) Electrical conduit and cable trays</td>
<td>Field Inspection</td>
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<tr>
<td>4) Bus ducts</td>
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<tr>
<td>5) Plumbing</td>
<td>Field Inspection</td>
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<tr>
<td>6) Manufacturing or Process Conveyors</td>
<td>Field Inspection</td>
<td></td>
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<tr>
<td>7) Fire Protection Sprinkler Pipe System</td>
<td>Field Inspection</td>
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<tr>
<td>MATERIAL / ACTIVITY</td>
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<tr>
<td>1705.11.5 Architectural Components Special Inspections for Seismic Resistance</td>
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</tr>
<tr>
<td>1. Inspection during the erection and fastening of exterior cladding and interior and exterior veneer.</td>
<td>Field inspection</td>
<td>***</td>
<td>Periodic</td>
<td></td>
<td></td>
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<tr>
<td>2. Inspection during the erection and fastening of interior and exterior non load bearing walls.</td>
<td>Field inspection</td>
<td>***</td>
<td>Periodic</td>
<td></td>
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<tr>
<td>3. Inspection during anchorage of access floors</td>
<td>Field inspection</td>
<td>***</td>
<td>Periodic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1705.11.6 Mechanical and Electrical Components Special Inspections for Seismic Resistance</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1. Inspection during the anchorage of electrical equipment for emergency or standby power systems.</td>
<td>Field inspection</td>
<td>***</td>
<td>Periodic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Inspection during the anchorage of other electrical equipment.</td>
<td>Field inspection</td>
<td>***</td>
<td>Periodic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Inspection during installation and anchorage of piping systems designed to carry hazardous materials, and their associated mechanical units</td>
<td>Field inspection</td>
<td>***</td>
<td>Periodic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Inspection during the installation and anchorage of ductwork designed to carry hazardous materials</td>
<td>Field inspection</td>
<td>***</td>
<td>Periodic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATERIAL / ACTIVITY</td>
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<td>EXTENT</td>
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<tr>
<td>5. Inspection during the installation and anchorage of vibration isolation systems.</td>
<td>Field inspection</td>
<td>1</td>
<td>Periodic</td>
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<tr>
<td>MATERIAL / ACTIVITY</td>
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<tr>
<td>1705.11.7 Storage Racks for Seismic Resistance</td>
<td>Field inspection</td>
<td></td>
<td>N</td>
<td>Periodic</td>
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<tr>
<td>Inspection during the anchorage storage racks 8 feet or greater in height.</td>
<td></td>
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<tr>
<td>1705.11.8 Seismic Isolation Systems</td>
<td>Shop and field inspection</td>
<td></td>
<td>N</td>
<td>Periodic</td>
<td></td>
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<tr>
<td>Inspection during the fabrication and installation of isolator units and energy dissipation devices used as part of the seismic isolation system.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1705.12.1 Concrete Reinforcement Testing and Qualification for Seismic Resistance</td>
<td>Field review</td>
<td></td>
<td>N</td>
<td>Each shipment</td>
<td></td>
</tr>
<tr>
<td>Verify reinforcing steel weldability</td>
<td>Review test reports</td>
<td></td>
<td>N</td>
<td>Each shipment</td>
<td></td>
</tr>
<tr>
<td>1705.12.2 Structural Steel Testing and Qualification for Seismic Resistance</td>
<td>Shop (3) and field testing</td>
<td></td>
<td>N</td>
<td>Per AISC 341</td>
<td></td>
</tr>
<tr>
<td>Test in accordance with the quality assurance requirements of AISC 341-10</td>
<td></td>
<td></td>
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<tr>
<td>1705.12.3 Seismic Certification of Nonstructural Components</td>
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</tr>
<tr>
<td>MATERIAL / ACTIVITY</td>
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<td>EXTENT</td>
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</tr>
<tr>
<td>Review certificate of compliance for designated seismic system components.</td>
<td>Certificate of compliance review</td>
<td>Det. By Owner</td>
<td>Each submittal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROJECT</td>
<td>(Completed by the Registered Design Professional in Responsible Charge)</td>
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<tr>
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<td>Y/N</td>
<td>EXTENT</td>
<td>AGENT*</td>
<td>DATE COMPLETED</td>
</tr>
<tr>
<td><strong>1705.12.4 Seismic Isolation Systems</strong></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Test seismic isolation system in accordance with ASCE 7 Section 17.8</td>
<td>Prototype testing</td>
<td>N</td>
<td>Per ASCE 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>1705.13 Sprayed Fire-resistant Materials</strong></td>
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</tr>
<tr>
<td>1. Verify surface condition preparation of structural members.</td>
<td>Field inspection</td>
<td>N</td>
<td>Periodic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Verify application of sprayed fire-resistant materials.</td>
<td>Field inspection</td>
<td>N</td>
<td>Periodic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Verify average thickness of sprayed fire-resistant materials applied to structural members.</td>
<td>Field inspection</td>
<td>N</td>
<td>Periodic</td>
<td></td>
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</tr>
<tr>
<td>4. Verify density of the sprayed fire-resistant material complies with approved fire-resistant design.</td>
<td>Field inspection and testing</td>
<td>N</td>
<td>Per Building Code section 1705.13.5</td>
<td></td>
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<tr>
<td>5. Verify the cohesive/adhesive bond strength of the cured sprayed fire-resistant material.</td>
<td>Field inspection and testing</td>
<td>N</td>
<td>Per Building Code section 1705.13.6</td>
<td></td>
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</tr>
<tr>
<td><strong>1705.14 Mastic and Intumescent Fire-Resistant Coatings</strong></td>
<td></td>
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</tr>
<tr>
<td>Inspect mastic and intumescent fire-resistant coatings applied to structural elements and decks, in accordance with AWCI 12-B.</td>
<td>Field inspection</td>
<td>N</td>
<td>Periodic</td>
<td></td>
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</tr>
<tr>
<td><strong>1705.15 Exterior Insulation and Finish Systems (EIFS)</strong></td>
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</table>
## SCHEDULE OF SPECIAL INSPECTION SERVICES

### PROJECT

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<table>
<thead>
<tr>
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<th>AGENT*</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1. Verify materials, details and installations are per the approved construction documents</td>
<td>Field inspection</td>
<td>N</td>
<td>Periodic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Inspection of water-resistive barrier coating over sheathing substrate</td>
<td>Field inspection</td>
<td>N</td>
<td>Periodic</td>
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</tr>
</tbody>
</table>

### 1705.16 Fire-Resistant Penetrations and Joints

1. Inspect penetration firestop | Field testing | N   | Per ASTM E 2174 |
2. Inspect fire-resistant joint systems | Field testing | N   | Per ASTM E 2393 |

### 1705.17 Smoke Control Systems

1. Leakage testing and recording of device locations prior to concealment. | Field testing | N   | Periodic |
2. Prior to occupancy and after sufficient completion, pressure difference testing, flow measurements, and detection and control verification. | Field testing | N   | Periodic |

### * INSPECTION AGENTS

1. 
2. 
3. 
4. 
5. 

Notes: 1. The inspection and testing agent(s) shall be engaged by the Owner or the Owner’s Agent, and not by the Contractor or Subcontractor whose work is to be inspected or tested. Any conflict of interest must be disclosed to the Building Official prior to commencing work. The qualifications of the Special Inspector(s) and/or testing agencies are subject to the approval of the Building Official and/or the Design Professional.
2. The list of Special Inspectors may be submitted as a separate document, if noted so above.
3. Special Inspections as required by Section 1704.2.5 are not required where the fabricator is approved in accordance with IBC Section 1704.2.5.2
4. Observe on a random basis, operations need not be delayed pending these inspections. Perform these tasks for each welded joint, bolted connection, or steel element.
5. NDT of welds completed in an approved fabricator's shop may be performed by that fabricator when approved by the AHJ. Refer to AISC 360, N7.
<table>
<thead>
<tr>
<th>MATERIAL / ACTIVITY</th>
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<tr>
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<td>Y/N</td>
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</tbody>
</table>

Circle "Yes" or "No" as appropriate and date this document below:

- Are Requirements for Seismic Resistance included in the Statement of Special Inspections? Yes ☒ No ☐
- Are Requirements for Tornado Resistance included in the Statement of Special Inspections? Yes ☒ No ☐

DATE:
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. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.120 Hazardous Waste Operations and Emergency Response
40 CFR 112 Oil Pollution Prevention
40 CFR 122.26 Storm Water Discharges (Applicable to State NPDES Programs, see section 123.25)
40 CFR 152 Pesticide Registration and Classification Procedures
40 CFR 152 - 186 Pesticide Programs
40 CFR 241 Guidelines for Disposal of Solid Waste
40 CFR 243 Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste
40 CFR 258 Subtitle D Landfill Requirements
40 CFR 260 Hazardous Waste Management System: General
40 CFR 261 Identification and Listing of Hazardous Waste
40 CFR 261.7 Residues of Hazardous Waste in Empty Containers
40 CFR 262 Standards Applicable to Generators of Hazardous Waste
40 CFR 262.31 Standards Applicable to Generators of Hazardous Waste-Labeling
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 273.3 Standards for Universal Waste Management - Pesticides

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 50 National Primary and Secondary Ambient Air Quality Standards

40 CFR 60 Standards of Performance for New Stationary Sources

40 CFR 63 National Emission Standards for Hazardous Air Pollutants for Source Categories

40 CFR 64 Compliance Assurance Monitoring

49 CFR 171 General Information, Regulations, and Definitions


49 CFR 172.101 Hazardous Material Regulation-Purpose and Use of Hazardous Material Table
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. http://www.epa.gov/ozone/science/ods/classone.html.

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. http://www.epa.gov/ozone/science/ods/classtwo.html.

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 Installation Pest Management Coordinator

Installation Pest Management Coordinator (IPMC) is the individual officially designated by the Installation Commander to oversee the Installation Pest Management Program and the Installation Pest Management Plan.

1.2.10 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.

1.2.11 Municipal Separate Storm Sewer System (MS4) Permit

MS4 permits are those held by installations to obtain NPDES permit coverage for their stormwater discharges.

1.2.12 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.

1.2.13 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.

1.2.14 Pesticide

Pesticide is any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest, or intended for use as a plant regulator, defoliant or desiccant.

1.2.15 Pesticide Treatment Plan

A plan for the prevention, monitoring, and control to eliminate pest infestation.

1.2.16 Pests

Pests are arthropods, birds, rodents, nematodes, fungi, bacteria, viruses, algae, snails, marine borers, snakes, weeds and other organisms (except for human or animal disease-causing organisms) that adversely affect readiness, military operations, or the well-being of personnel and animals; attack or damage real property, supplies, equipment, or vegetation; or are otherwise undesirable.

1.2.17 Project Pesticide Coordinator

The Project Pesticide Coordinator (PPC) is an individual who resides at a Civil Works Project office and who is responsible overseeing of pesticide application on project grounds.

1.2.18 Regulated Waste

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

1.2.19 Sediment

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

1.2.20 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:
1.2.20.1 Debris

Debris is non-hazardous solid material generated during the construction, demolition, or renovation of a structure that exceeds 2.5-inch particle size that is: a manufactured object; plant or animal matter; or natural geologic material (for example, cobbles and boulders), broken or removed concrete, masonry, and rock asphalt paving; ceramics; roofing paper and shingles. Inert materials may not be reinforced with or contain ferrous wire, rods, accessories and weldments. A mixture of debris and other material such as soil or sludge is also subject to regulation as debris if the mixture is comprised primarily of debris by volume, based on visual inspection.

1.2.20.2 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.

1.2.20.3 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.

1.2.20.4 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.

1.2.20.5 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.

1.2.20.6 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.
1.2.20.7 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.

1.2.20.8 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.

1.2.21 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.

1.2.22 Wastewater

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

1.2.22.1 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.

1.2.23 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.

1.2.24 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.

1.2.25 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" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

- Preconstruction Survey
- Solid Waste Management Permit; G
- Regulatory Notifications; G
- Environmental Protection Plan; 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

SD-06 Test Reports

- Inspection Reports
- Solid Waste Management Report; G

SD-07 Certificates

- Employee Training Records; G
- Certificate of Competency
- 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
- Solid Waste Management Report; G
- Contractor Hazardous Material Inventory Log; G
- Hazardous Waste/Debris Management; G
1.4 ENVIRONMENTAL PROTECTION REQUIREMENTS

Provide and maintain, during the life of the contract, environmental protection as defined. Plan for and provide environmental protective measures to control pollution that develops during construction practice. Plan for and provide environmental protective measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project. Protect the environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire duration of this Contract. Comply with federal, state, and local regulations pertaining to the environment, including water, air, solid waste, hazardous waste and substances, oily substances, and noise pollution.

Tests and procedures assessing whether construction operations comply with Applicable Environmental Laws may be required. Analytical work must be performed by qualified laboratories; and where required by law, the laboratories must be certified.

1.4.1 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 at least 15 days prior to commencement of work activities. Typically, regulatory notifications must be provided for the following (this listing is not all-inclusive): demolition, renovation, NPDES defined site work, construction, removal or use of a permitted air emissions source, and remediation of controlled substances (asbestos, hazardous waste, lead paint).

1.5.3 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 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 EPA 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 as defined by EPA.

1.5.4.1 Pest Control Training

Trained personnel in pest control. Conduct a pest control meeting for personnel prior to commencing construction activities. Conduct additional meetings for new personnel and when site conditions change. Include in the training and meeting agenda: methods of detecting and pest infestation; familiarization with statutory and contractual pest control standards; installation and care of devices, and instruments, if required, for monitoring purposes to ensure adequate and continuous pest control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of waters of the United States, and endangered species and their habitat that are known to be in the area. Provide a Certificate of Competency for the personnel who will be conducting the pesticide application and management of pest control.

1.5.5 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. No time extensions will be granted or equitable adjustments allowed for any such suspensions. This is in addition to any other actions the Contracting Officer may take under the contract, or in accordance with the Federal Acquisition Regulation or Federal Law.

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 notice to proceed and not less than 10 days before the preconstruction meeting. 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, pesticide treatment plan, traffic control plan, Non-Hazardous Solid Waste Disposal Plan, borrowing material 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 and 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 consists of the management procedures for hazardous waste to be generated. The elements of those procedures will coincide with the Installation Hazardous Waste Management Plan. 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 Monitoring

For the protection of public health, monitor and control contaminant emissions to the air from Hazardous, Toxic, and Radioactive Waste remedial action area sources to minimize short-term risks that might be posed to the community during implementation of the remedial alternative in accordance with the following.

a. Perimeter Air Contaminant of Concern.

b. Time Averaged Perimeter Action Levels.
c. Perimeter Sampling/Monitoring Location.
d. Monitoring Instruments/Sampling and Analysis Methods.
e. Staffing.

1.6.9.7 Compliant Materials

Provide the Government a list of and 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. The following permits have been obtained by the Government:

b. The following permits will be obtained by the Government:

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 PESTICIDE DELIVERY, STORAGE, AND HANDLING

1.9.1 Delivery and Storage

Deliver pesticides to the site in the original, unopened containers bearing legible labels indicating the EPA registration number and the manufacturer's registered uses. Store pesticides according to manufacturer's instructions and under lock and key when unattended.

1.9.2 Handling Requirements

Formulate, treat with, and dispose of pesticides and associated containers in accordance with label directions and use the clothing and personal protective equipment specified on the labeling for use during each phases of the application. Furnish SDSs for pesticide products.

1.10 SOLID WASTE MANAGEMENT PERMIT

Provide the Contracting Officer with written notification of the quantity of anticipated solid waste or debris that is anticipated or estimated to be generated by construction. Include in the report the locations where various types of waste will be disposed or recycled. Include letters of acceptance from the receiving location or as applicable; submit one copy of
the receiving location state and local Solid Waste Management Permit or license showing such agency's approval of the disposal plan before transporting wastes off Government property.

1.10.1 Solid Waste Management Report

Monthly, submit a solid waste disposal report to the Contracting Officer. For each waste, the report will state the classification (using the definitions provided in this section), amount, location, and name of the business receiving the solid waste.

1.11 FACILITY HAZARDOUS WASTE GENERATOR STATUS

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
3.1.3 Streams

Stream crossings must allow movement of materials or equipment without violating water pollution control standards of the federal, state, and local governments. Construction of stream crossing structures must be in compliance with any required permits including, but not limited to, Clean Water Act Section 404, and Section 401 Water Quality.

The Contracting Officer's approval and appropriate permits are required before any equipment will be permitted to ford live streams. In areas where frequent crossings are required, install temporary culverts or bridges. Obtain Contracting Officer's approval prior to installation. Remove temporary culverts or bridges upon completion of work, and repair the area to its original condition unless otherwise required by the Contracting Officer.

3.2 STORMWATER

Do not discharge stormwater from construction sites to the sanitary sewer. If the water is noted or suspected of being contaminated, it may only be released to the storm drain system if the discharge is specifically permitted. Obtain authorization in advance from the Installation Environmental Office for any release of contaminated water.

3.2.1 Construction General Permit

Provide a Construction General Permit as required by 40 CFR 122.26 or EPA General Permit. Under the terms and conditions of the permit, install, inspect, maintain BMPs, prepare stormwater erosion and sediment control inspection reports, and submit SWPPP inspection reports. Maintain construction operations and management in compliance with the terms and conditions of the general permit for stormwater discharges from construction activities.

3.2.1.1 Stormwater Pollution Prevention Plan

Submit a project-specific Stormwater Pollution Prevention Plan (SWPPP) to the Contracting Officer for approval, prior to the commencement of work. The SWPPP must meet the requirements of 40 CFR 122.26 and the EPA General Permit State General Permit for stormwater discharges from construction sites.

Include the following:

a. Comply with terms of the EPA general permit for stormwater discharges from construction activities. Prepare SWPPP in accordance with EPA requirements. Use EPA guide Developing your Stormwater Pollution Prevention Plan located at http://water.epa.gov/polwaste/npdes/stormwater/Stormwater-Pollution-Prevention-Plans-for-Construction-Activities.cfm to prepare the SWPPP.

b. Select applicable BMPs from EPA Fact Sheets located at http://water.epa.gov/polwaste/npdes/swbmp/Construction-Site-StormWater-Run-Off-Control.cfm or in accordance with applicable state or local requirements.
c. Include a completed copy of the Notice of Intent, BMP Inspection Report Template, and Stormwater Notice of Termination, except for the effective date.

3.2.1.2 Stormwater Notice of Intent for Construction Activities
Prepare and submit the Notice of Intent for NPDES coverage under the general permit for construction activities to the Contracting Officer for review and approval.

Submit the approved NOI and appropriate permit fees onto the appropriate federal or state agency for approval. No land disturbing activities may commence without permit coverage. Maintain an approved copy of the SWPPP at the onsite construction office, and continually update as regulations require, reflecting current site conditions.

3.2.1.3 Inspection Reports
Submit "Inspection Reports" to the Contracting Officer in accordance with EPA Construction General Permit.

3.2.1.4 Stormwater Pollution Prevention Plan Compliance Notebook
Create and maintain a three ring binder of documents that demonstrate compliance with the Construction General Permit. Include a copy of the permit Notice of Intent, proof of permit fee payment, SWPPP and SWPPP update amendments, inspection reports and related corrective action records, copies of correspondence with the EPA, and a copy of the permit Notice of Termination in the binder. At project completion, the notebook becomes property of the Government. Provide the compliance notebook to the Contracting Officer.

3.2.1.5 Stormwater Notice of Termination for Construction Activities
Submit a Notice of Termination to the Contracting Officer for approval once construction is complete and final stabilization has been achieved on all portions of the site for which the permittee is responsible. Once approved, submit the Notice of Termination to the appropriate state or federal agency. 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
Provide erosion and sediment control measures in accordance with state and local laws and regulations. Preserve vegetation to the maximum extent practicable.

Erosion control inspection reports may be compiled as part of a stormwater pollution prevention plan inspection reports.

3.2.2.1 Erosion Control
Prevent erosion by methods necessary for effective erosion control as indicated on civil drawings. Use of hay bales is prohibited.

Provide seeding in accordance with Section 32 92 19 SEEDING.
3.2.2.2 Sediment Control Practices

Implement sediment control practices to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Implement sediment control practices prior to soil disturbance and prior to creating areas with concentrated flow, during the construction process to minimize erosion and sediment laden runoff. Include the following devices: silt fence, temporary diversion dikes, storm drain inlet protection; location and details of installation and construction are indicated on the drawings.

3.2.3 Work Area Limits

Mark the areas that need not be disturbed under this Contract prior to commencing construction activities. Mark or fence isolated areas within the general work area that are not to be disturbed. Protect monuments and markers before construction operations commence. Where construction operations are to be conducted during darkness, 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.

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 Clean Water Act Section 404, Nation Wide Permit No. TBD. 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, except as authorized herein. The protection of waters of the United States shown on the drawings in accordance with paragraph LICENSES AND PERMITS is the Contractor's responsibility. Authorization to enter specific waters of the United States identified does not relieve the Contractor from any obligation to protect other waters of the United States within, adjacent to, or in the vicinity of the construction site and associated boundaries.

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 Preconstruction Air Permits

Notify the Air Program Manager, through the Contracting Officer, at least 6 months prior to bringing equipment, assembled or unassembled, onto the Installation, so that air permits can be secured. Necessary permitting time must be considered in regard to construction activities. Clean Air Act (CAA) permits must be obtained prior to bringing equipment, assembled or unassembled, onto the Installation.

Permits will be provided by the Government.

3.5.2 Oil or Dual-fuel Boilers and Furnaces

Provide product data and details for new, replacement, or relocated fuel fired boilers, heaters, or furnaces to the Installation Environmental Office (Air Program Manager) through the Contracting Officer. Data to be reported include: equipment purpose (water heater, building heat, process), manufacturer, model number, serial number, fuel type (oil type, gas type) size (MMBTU heat input). Provide in accordance with paragraph PRECONSTRUCTION AIR PERMITS.
3.5.3 Burning

Burning is prohibited on the Government premises.

3.5.4 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.

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.

3.5.7 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 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, as appropriate |
| C&D Debris Recycled | cubic yards, as appropriate |
| Total C&D Debris Generated | cubic yards, as appropriate |
| Waste Sent to Waste-To-Energy Incineration Plant (This amount should not be included in the recycled amount) | cubic yards, 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
3.7.2 Solid Waste Management

3.7.2.1 Solid Waste Management Report

Provide copies of the waste handling facilities' weight tickets, receipts, bills of sale, and other sales documentation. In lieu of sales documentation, a statement indicating the disposal location for the solid waste that is signed by an employee authorized to legally obligate or bind the firm may be submitted. The sales documentation Contractor certification must include the receiver's tax identification number and business, EPA or state registration number, along with the receiver's delivery and business addresses and telephone numbers. For each solid waste retained for the Contractor's own use, submit the information previously described in this paragraph on the solid waste disposal report. Prices paid or received do not have to be reported to the Contracting Officer unless required by other provisions or specifications of this Contract or public law.

3.7.2.2 Control and Management of Solid Wastes

Pick up solid wastes, and place in covered containers that are regularly emptied. Do not prepare or cook food on the project site. Prevent contamination of the site or other areas when handling and disposing of wastes. At project completion, leave the areas clean. Employ segregation measures so that no hazardous or toxic waste will become co-mingled with non-hazardous solid waste. Transport solid waste off Government property and dispose of it in compliance with 40 CFR 260, state, and local requirements for solid waste disposal. A Subtitle D RCRA permitted landfill is the minimum acceptable offsite solid waste disposal option. Verify that the selected transporters and disposal facilities have the necessary permits and licenses to operate. Comply with site procedures. Segregate and separate treated wood components disposed at a lined landfill approved to accept this waste in accordance with local and state regulations. Solid waste disposal offsite must comply with most stringent local, state, and federal requirements, including 40 CFR 241, 40 CFR 243, and 40 CFR 258.

Manage hazardous material used in construction, including but not limited to, aerosol cans, waste paint, cleaning solvents, contaminated brushes, and used rags, in accordance with 49 CFR 173.

3.7.3 Control and Management of Hazardous Waste

Do not dispose of hazardous waste on Government property. Do not discharge any waste to a sanitary sewer, storm drain, or to surface waters or conduct waste treatment or disposal on Government property without written approval of the Contracting Officer.

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 Hazardous Waste Disposal

3.7.3.2.1 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.

3.7.3.2.1.1 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).

3.7.3.2.1.2 Samples

Obtain a representative sample of the material generated for each job done to provide waste stream determination.

3.7.3.2.1.3 Analysis

Analyze each sample taken and provide analytical results to the Contracting Officer. See paragraph WASTE DETERMINATION DOCUMENTATION.

3.7.3.2.1.4 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.

3.7.3.2.2 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.

3.7.3.3 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. Pesticides as described in 40 CFR 273.3

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.

3.7.3.4 Electronics End-of-Life Management

Recycle or dispose of electronics waste, including, but not limited to, used electronic devices such as computers, monitors, hard-copy devices, televisions, mobile devices, in accordance with 40 CFR 260-262, state, and local requirements, and installation instructions.

3.7.3.5 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.

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.

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 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. by collecting and placing it in a retention pond where suspended material can be settled out or the water can evaporate to separate pollutants from the water. The site for the retention pond must be coordinated and approved with the Contracting Officer. The residue left in the pond prior to completion of the project must be removed, tested, and disposed of off-Government property in accordance with federal, state, and local laws and regulations. Backfill the area to the original grade, top-soiled, and seeded or sodded. Test the water in the retention pond the results reviewed and approved by the Contracting Officer prior to being discharged or disposed of off-Government property.

3.7.6.1.2 Surface Discharge

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 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- ), 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 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

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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.

3.10.1 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.

3.10.2 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.

3.11 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.

3.12 PEST MANAGEMENT

In order to minimize impacts to existing fauna and flora, coordinate with the Installation Pest Management Coordinator (IPMC) or Project Pesticide Coordinator (PPC), through the Contracting Officer, at the earliest possible time prior to pesticide application. Discuss integrated pest
management strategies with the IPMC and receive concurrence from the IPMC through the Contracting Officer prior to the application of any pesticide associated with these specifications. Provide Installation Project Office Pest Management personnel the opportunity to be present at meetings concerning treatment measures for pest or disease control and during application of the pesticide. See The use and management of pesticides are regulated under 40 CFR 152 - 186.

3.12.1 Application

Apply pesticides using a state-certified pesticide applicator in accordance with EPA label restrictions and recommendation. The certified applicator must wear clothing and personal protective equipment as specified on the pesticide label. The Contracting Officer will designate locations for water used in formulating. Do not allow the equipment to overflow. Inspect equipment for leaks, clogging, wear, or damage and repair prior to application of pesticide.

3.12.2 Pesticide Treatment Plan

Include and update a pesticide treatment plan, as information becomes available. Include in the plan the sequence of treatment, dates, times, locations, pesticide trade name, EPA registration numbers, authorized uses, chemical composition, formulation, original and applied concentration, application rates of active ingredient (that is, pounds of active ingredient applied), equipment used for application and calibration of equipment. Comply with 40 CFR 152-189, state, regional, and local pest management record-keeping and reporting requirements as well as any additional Installation Project Office specific requirements in conformance with A AR 200-1 Chapter 5, Pest Management, Section 5-4 "Program requirements" for data required to be reported to the Installation.

3.13 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.

3.14 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. 4 p.m., Monday through Friday, exclusive of holidays, unless otherwise specified.

Keep construction activities under surveillance and control to minimize environment damage by noise. Comply with the provisions of the State of Mississippi rules.

3.15 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.

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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. GREEN BUILDING COUNCIL (USGBC)

LEED BD+C (2009; R 2010) Leadership in Energy and Environmental Design (LEED-NC)


1.2 GOVERNMENT POLICY

Government policy is to apply sound environmental principles in the design, construction and use of facilities. As part of the implementation of that policy: (1) practice efficient waste management when sizing, cutting, and installing products and materials and (2) use all reasonable means to divert construction and demolition waste from landfills and incinerators and to facilitate their recycling or reuse. Divert a minimum of 50 percent by weight of total project solid waste from the landfill.

1.3 MANAGEMENT

Develop and implement a waste management program. Take a pro-active, responsible role in the management of construction and demolition waste and require all subcontractors, vendors, and suppliers to participate in the effort. Construction and demolition waste includes products of demolition or removal, excess or unusable construction materials, packaging materials for construction products, and other materials generated during the construction process but not incorporated into the work. In the management of waste, consider the availability of viable markets, the condition of the material, the ability to provide the material in suitable condition and in a quantity acceptable to available markets, and time constraints imposed by internal project completion mandates. Implement any special programs involving rebates or similar incentives related to recycling of waste. Revenues or other savings obtained for salvage, or recycling accrue to the Contractor. Appropriately permit firms and facilities used for recycling, reuse, and disposal for the intended use to the extent required by federal, state, and local regulations. Also, 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 project.
1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Architect's approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals
   Waste Management Plan; G

SD-11 Closeout Submittals
   Records;

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 Waste Management Plan and to develop a mutual understanding relative to the details of waste management. At a minimum, discuss environmental and waste management goals and issues at the following additional meetings:

   a. Pre-bid meeting.
   b. Preconstruction meeting.
   c. Regular site meetings.
   d. Work safety meetings.

1.6 WASTE MANAGEMENT PLAN

Submit a waste management plan within 15 days after notice to proceed and not less than 10 days before the preconstruction meeting. The plan demonstrates how to meet the project waste diversion goal. Also, include the following in the plan:

   a. Name of individuals on the Contractor's staff responsible for waste prevention and management.
   b. Actions that will be taken to reduce solid waste generation, 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 wastes.
   e. Characterization, including estimated types and quantities, of the waste to be generated.
   f. Name of landfill and/or incinerator to be used and the estimated costs for use, assuming that there would be no salvage or recycling on the
g. Identification of local and regional reuse programs, including non-profit organizations such as schools, local housing agencies, and organizations that accept used materials such as materials exchange networks and Habitat for Humanity. Include the name, location, and phone number for each reuse facility to be used, and provide a copy of the permit or license for each facility.

h. List of specific waste materials 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, location, and phone number, including a copy of the permit or license for each facility.

i. Identification of materials that cannot be recycled/reused with an explanation or justification, to be approved by the Contracting Officer.

j. Description of the means by which any waste materials identified in item (h) above will be protected from contamination.

k. 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).

l. Anticipated net cost savings determined by subtracting Contractor program management costs and the cost of disposal from the revenue generated by sale of the materials and the incineration and/or landfill cost avoidance.

Revise and resubmit Plan as required by the Contracting Officer. Approval of Contractor's Plan will not relieve the Contractor of responsibility for compliance with applicable environmental regulations or meeting project cumulative waste diversion requirement. Distribute copies of the Waste Management Plan to each subcontractor, the Quality Control Manager, and the Contracting Officer.

1.7 RECORDS

Maintain records to document the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration. Keep records in accordance with the LEED GBDC Ref Guide and using the LEED BD+C Letter Template. Make the records available to the Contracting Officer during construction, and deliver to the Contracting Officer upon completion of the construction include in the Sustainability Notebook a copy of the records.

Demolition accomplished by other parties on this project site count toward the project's total waste diversion cumulative score for LEED BD+C and for sustainability requirements. Information on the quantity and disposition of these materials will be provided by the Contracting Officer. Include this data in records, annotated to indicate that it was accomplished by another party.

1.8 COLLECTION

Separate, store, protect, and handle at the site identified recyclable and salvageable waste products in a manner that maximizes recyclability and
salvagability of identified materials. Provide the necessary containers, bins and storage areas to facilitate effective waste management and clearly and appropriately identify them. Provide materials for barriers and enclosures around recyclable material storage areas which are nonhazardous and recyclable or reusable. Locate out of the way of construction traffic. Provide adequate space for pick-up and delivery and convenience to subcontractors. Recycling and waste bin areas are to be kept neat and clean, and handle recyclable materials to prevent contamination of materials from incompatible products and materials. Clean contaminated materials prior to placing in collection containers. Use cleaning materials that are nonhazardous and biodegradable. Handle hazardous waste and hazardous materials in accordance with applicable regulations and coordinate with Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS.

Separate materials by one of the following methods:

1.8.1 Source Separated Method.

Separate waste products and materials that are recyclable from trash and sorted as described below into appropriately marked separate containers and then transported 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 following category types as appropriate to the project waste and to the available recycling and reuse programs in the project area:

a. Land clearing debris.

b. Asphalt.

c. Concrete and masonry.

d. Metal (e.g. banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized, stainless steel, aluminum, copper, zinc, lead brass, bronze).
   (1) Ferrous.
   (2) Non-ferrous.

e. Wood (nails and staples allowed).

f. Debris.

g. Glass (colored glass allowed).

h. Paper.
   (1) Bond.
   (2) Newsprint.
   (3) Cardboard and paper packaging materials.

i. Plastic.
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j. Gypsum.

k. Non-hazardous paint and paint cans.

l. Carpet.

m. Ceiling tiles.

n. Insulation.

o. Beverage containers.

1.8.2 Co-Mingled Method.

Place waste products and recyclable materials into a single container and then transport to a recycling facility where the recyclable materials are sorted and processed.

1.8.3 Other Methods.

Other proposed methods may be used when approved by the Contracting Officer.

1.9 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. Except as otherwise specified in other sections of the specifications, dispose of in accordance with the following:

1.9.1 Reuse.

Give first consideration to salvage for reuse since little or no re-processing is necessary for this method, and less pollution is created when items are reused in their original form. Coordinate reuse with the Contracting Officer. Consider sale or donation of waste suitable for reuse.
1.9.2 Recycle.

Recycle waste materials not suitable for reuse, but having value as being recyclable. Recycle all fluorescent lamps, HID lamps, and mercury-containing thermostats removed from the site. Arrange for timely pickups from the site or deliveries to recycling facilities in order to prevent contamination of recyclable materials.

1.9.3 Waste.

Dispose of materials with no practical use or economic benefit to waste-to-energy plants where available. As the last choice, dispose of materials at a landfill or incinerator.

1.9.4 Return

Set aside and protect misdelivered and substandard products and materials and return to supplier for credit.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --
PART 1   GENERAL

1.1 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. Submittals with an "S" are for inclusion in the Sustainability Notebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. 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

1.2 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.

1.2.1 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.

1.2.2 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. Provide a Data Package as
specified in the individual technical section, for items that are commissioned.

1.2.3 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.

1.2.4 Commissioning Authority Review and Approval

Submit the commissioned systems and equipment submittals to the Commissioning Authority (CxA) to review for completeness and applicability. Obtain validation from the CxA that the systems and equipment provided meet the requirements of the Contract documents and design intent, particularly as they relate to functionality, energy performance, water performance, maintainability, sustainability, system cost, indoor environmental quality, and local environmental impacts. The CxA communicates deficiencies to the Contracting Officer. Submit the O&M manuals to the Contracting Officer upon a successful review of the corrections, and with the CxA recommendation for approval and acceptance of these O&M manuals. This work is in addition to the normal review procedures for O&M data.

1.3 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.

1.4 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.

1.4.1 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.

1.4.2 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
1.5 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.

1.5.1 Operating Instructions

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

1.5.1.1 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.

1.5.1.2 Operator Prestart

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

1.5.1.3 Startup, Shutdown, and Post-Shutdown Procedures

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

1.5.1.4 Normal Operations

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

1.5.1.5 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.
1.5.1.6 Operator Service Requirements

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

1.5.1.7 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.

1.5.1.8 Operating Log

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

1.5.1.9 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.

1.5.2 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.

1.5.2.1 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.

1.5.2.2 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.

1.5.3 Repair

Provide manufacturer's recommended procedures and instructions for correcting problems and making repairs.
1.5.3.1 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.

1.5.3.2 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.

1.5.3.3 Repair Procedures

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

1.5.3.4 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.

1.5.3.5 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.

1.5.3.6 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.

1.5.4 Real Property Equipment

Provide a list of installed equipment furnished under this contract. Include all information usually listed on manufacturer's name plate. In the "EQUIPMENT-IN-PLACE LIST" include, as applicable, the following for each piece of equipment installed: description of item, location (by room number), model number, serial number, capacity, name and address of manufacturer, name and address of equipment supplier, condition, spare parts list, manufacturer's catalog, and warranty. Submit the final list 30 days after transfer of the completed facility.

Key the designations to the related area depicted on the contract drawings. List the following data:
1.5.5 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:

1.5.5.1 Product Submittal Data

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

1.5.5.2 Manufacturer's Instructions

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

1.5.5.3 O&M Submittal Data

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

1.5.5.4 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.

1.5.5.5 Warranty Information

List and explain the various warranties and clearly identify the servicing and technical precautions prescribed by the manufacturers or contract documents in order to keep warranties in force. Include warranty information for primary components of the system. Provide copies of warranties as required.
1.5.5.6 Extended Warranty Information

List all warranties for products, equipment, components, and sub-components whose duration exceeds one year. For each warranty listed, indicate the applicable specification section, duration, start date, end date, and the point of contact for warranty fulfillment. Also, list or reference the specific operation and maintenance procedures that must be performed to keep the warranty valid. Provide copies of warranties as required.

1.5.5.7 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.

1.5.5.8 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.

1.5.5.9 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.

1.5.5.10 Field Test Reports

Provide a copy of Field Test Reports (SD-06) submittals documented with the required approval.

1.5.5.11 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.

1.6 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:

1.6.1 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

1.6.2  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

1.6.3  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

1.6.4 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

1.6.5 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
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 building maintenance personnel, and applicable building occupants. Instructors must be well-versed in the particular systems that they are presenting. Address aspects of the Operation and Maintenance Manual as required. Training must include classroom or field lectures based on the system operating requirements. The location of classroom training requires approval by the Contracting Officer.

3.1.1 Training Plan

Submit a written training plan to the Contracting Officer for approval at least 60 calendar days prior to the scheduled training. Training plan must be approved by the Quality Control Manager (QC) or the Commissioning Authority (CxA) as required prior to forwarding to the Contracting Officer. Also, coordinate the training schedule with the Contracting Officer and QC or CxA. Include within the plan the following elements:

a. Equipment included in training
b. Intended audience
c. Location of training
d. Dates of training
e. Objectives
f. Outline of the information to be presented and subjects covered including description
g. Start and finish times and duration of training on each subject
h. Methods (e.g. classroom lecture, video, site walk-through, actual operational demonstrations, written handouts)
i. Instructor names and instructor qualifications for each subject
j. List of texts and other materials to be furnished by the Contractor that are required to support training
k. Description of proposed software to be used for video recording of training sessions.
3.1.2 Training Content

The core of this training must be based on manufacturer's recommendations and the operation and maintenance information. The QC or CxA is responsible for overseeing and approving the content and adequacy of the training. Spend 95 percent of the instruction time during the presentation on the OPERATION AND MAINTENANCE DATA. Include the following for each system training presentation:

a. Start-up, normal operation, shutdown, unoccupied operation, seasonal changeover, manual operation, controls set-up and programming, troubleshooting, and alarms.

b. Relevant health and safety issues.

c. Discussion of how the feature or system is environmentally responsive. Advise adjustments and optimizing methods for energy conservation.

d. Design intent.

e. Use of O&M Manual Files.

f. Review of control drawings and schematics.

g. Interactions with other systems.

h. Special maintenance and replacement sources.

i. Tenant interaction issues.

3.1.3 Training Outline

Provide the Operation and Maintenance Manual Files (Bookmarked PDF) and a written course outline listing the major and minor topics to be discussed by the instructor on each day of the course to each trainee in the course. Provide the course outline 14 calendar days prior to the training.

3.1.4 Training Video Recording

Record classroom training session(s) on video. Provide to the Contracting Officer two copies of the training session(s) in DVD video recording format. Capture within the recording, in video and audio, the instructors' training presentations including question and answer periods with the attendees. The recording camera(s) must be attended by a person during the recording sessions to assure proper size of exhibits and projections during the recording are visible and readable when viewed as training.

3.1.5 Unresolved Questions from Attendees

If, at the end of the training course, there are questions from attendees that remain unresolved, the instructor must send the answers, in writing, to the Contracting Officer for transmittal to the attendees, and the training video must be modified to include the appropriate clarifications.

3.1.6 Validation of Training Completion

Ensure that each attendee at each training session signs a class roster daily to confirm Government participation in the training. At the
completion of training, submit a signed validation letter that includes a sample record of training for reporting what systems were included in the training, who provided the training, when and where the training was performed, and copies of the signed class rosters. Provide two copies of the validation to the Contracting Officer, and one copy to the Operation and Maintenance Manual Preparer for inclusion into the Manual's documentation.

3.1.7 Quality Control Coordination

Coordinate this training with the QC or CxA in accordance with Section 01 45 00.00 10 QUALITY CONTROL.

-- End of Section --
PART 1  GENERAL

1.1  SUMMARY

Commission the building systems listed herein. Employ the services of an independent Commissioning Firm. The Commissioning Firm must be a 1st tier subcontractor of the General or Prime Contractor and must be financially and corporately independent of all other subcontractors. The Commissioning Firm must employ a Lead Commissioning Specialist that coordinates all aspects of the commissioning process. Conform to the commissioning procedures outlined in this specification.

1.2  SYSTEMS TO BE COMMISSIONED

Commission the following systems:

- Heating, Ventilating, Air Conditioning, and Refrigeration Systems (HVAC)
- Building Automation System
- Utility Monitoring and Control System
- Lighting Systems
- Power Distribution Systems
- Service Water Heating Systems
- Plumbing Systems
- Energy and Water Utility Metering Systems and Sub-Meters

1.3  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)

- ASSOCIATED AIR BALANCE COUNCIL (AABC)

- NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB)
1.4 COMMUNICATION WITH THE GOVERNMENT

The Lead Commissioning Specialist (CxC) must submit all plans, schedules, reports, and documentation directly to the Contracting Officer Representative concurrent with submission to the CQC System Manager. The Lead Commissioning Specialist must have direct communication with the Contracting Officer's Representative regarding all elements of the commissioning process; however, the Government has no direct contract authority with the Lead Commissioning Specialist.

1.5 SEQUENCING AND SCHEDULING

1.5.1 Sequencing

Complete the following prior to starting Functional Performance Tests of mechanical systems:

a. All equipment and systems have been completed, cleaned, flushed, disinfected, calibrated, tested, and operate in accordance with contract documents and construction plans and specifications.

b. Performance Verification Tests of the controls systems have been completed and the Performance Verification Test Report has been submitted and approved in accordance with Specification Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.

c. Testing, Adjusting, and Balancing has been completed and the Testing, Adjusting, and Balancing Report, has been submitted and approved in accordance with Specification Section 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC.

d. The building envelope is enclosed according to contract documents with final construction completed.

e. The Pre-Functional Checklists have been submitted and approved.

f. The Certificate of Readiness for mechanical systems has been submitted and approved.

Complete the following prior to starting Functional Performance Tests of the electrical systems:

a. All electrical, power generation, and lighting equipment and systems have been completed, calibrated, tested, and operate in accordance with contract documents and construction plans and specifications.

b. The building envelope is enclosed according to contract documents with final construction completed.

c. Ceiling tiles, floor coverings, and window coverings are in place.

d. The Certificate of Readiness for electrical systems has been submitted and approved.
1.5.2 Project Schedule

Include the following tasks in the project schedule. Ensure sufficient time is scheduled to accommodate the requirements of this specification section. The order of items listed below is not intended to imply a specified sequence:

a. Submission and approval of the Commissioning Firm and Commissioning Specialist

b. Submission and approval of the Testing, Adjusting, and Balancing (TAB) Firm and TAB Specialist specified in Section 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC

c. Submission of the Design Review Report specified in Section 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC.

d. Submission and approval of the Construction Phase Commissioning Plan

f. Installation of permanent utilities (gas, water, electric)

j. Drainage and Vent, Building Sewers, Water Supply Systems and Backflow Prevention Assembly Tests specified in Section 22 00 00 PLUMBING, GENERAL PURPOSE

k. Factory Acceptance Testing for each of the systems to be commissioned as required by technical specifications

l. Manufacturer's Equipment Start-Up for each of the systems to be commissioned.

m. Potable Water System Flushing specified in Section 22 00 00 PLUMBING, GENERAL PURPOSE

n. Operational Tests of the plumbing system specified in Section 22 00 00 PLUMBING, GENERAL PURPOSE.

o. Potable Water System Disinfection specified in Section 22 00 00 PLUMBING, GENERAL PURPOSE

p. Submission and approval of the TAB Schematic Drawings, Report Forms, and Procedures specified in Section 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC.

q. Submission and approval of Duct Air Leakage Test Procedures specified in Section 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC

r. Duct Air Leakage Test Execution specified in Section 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC

s. Submission and approval of the Final Duct Air Leakage Test Report specified in Section 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC

t. Testing, Adjusting, and Balancing (TAB) Field Work required by Section 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC
u. Submission and approval of the TAB Report specified in Section 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC

v. TAB Field Acceptance Testing required by Section 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC

w. Submission and approval of the Start-Up Testing Report specified in Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.

x. Submission and approval of the Performance Verification Test Procedures specified in Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.

y. Performance Verification Tests required by Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC

z. Performance Verification Test Report specified in Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC

aa. Pre-Functional Checklist Submittal

bb. Functional Performance Testing for each system to be commissioned

c. Integrated Systems Tests

dd. Post-Test Deficiency Correction for each system to be commissioned

e. Re-Testing

gg. Training for each of the systems to be commissioned

hh. Systems Manual, Maintenance Plan, and Service Life Plan submission and approval

ii. Seasonal Testing

1.6 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Commissioning Firm; G, DO

Lead Commissioning Specialist; G, DO

Technical Commissioning Specialists; G, DO

Commissioning Firm's Contract; G, DO

SD-06 Test Reports
Provide a Commissioning Firm that is certified in commissioning by one of the following: the AABC Commissioning Group (ACG); the National Environmental Balancing Bureau (NEBB); the International Certification Board/Testing, Adjusting, and Balancing Bureau (ICB/TABB), the Building Commissioning Association (BCA); the Association of Energy Engineers (AEE).

The Commissioning Firm must be certified in all systems to be commissioned to the extent such certifications are available from the certifying body. Describe any lapses in certification or disciplinary action taken by the certifying body against the proposed Commissioning Firm or Lead Commissioning Specialist in detail. Any firm or commissioning professional that has been the subject of disciplinary action by the certifying body within the five years preceding contract award is not eligible to perform any duties related to commissioning.

a. Submit the Commissioning Firm's certification of qualifications including the name of the firm and certifications no later than 30 calendar days after Notice to Proceed. Submit one hard copy and an electronic copy.

b. The Commissioning Firm's and Commissioning Specialists' certifications must be maintained for the entire duration of the duties specified herein. If, for any reason, the firm or a specialist loses a certification during this period, immediately notify the Contracting
Officer's Representative and submit another Commissioning Firm or Commissioning Specialist for approval. All work specified in this specification section performed by the Commissioning Firm or associated Commissioning Specialists is invalid if the Commissioning Firm or Commissioning Specialist loses its certification prior to contract completion and must be performed by an approved successor.

c. The Commissioning Firm must oversee and assist the General or Prime Contractor with the work specified herein. Submit the Commissioning Firm's Contract including the Scope of Work associated with the paragraph POST-CONSTRUCTION SUPPORT no later than 30 calendar days after approval of the Commissioning Firm. Submit one hard copy and an electronic copy.

1.7.1 Lead Commissioning Specialist

The Commissioning Firm must provide a Lead Commissioning Specialist (CxC) that has a minimum of five years of commissioning experience, including two projects of similar size and complexity, and that is one of the following: a NEBB qualified Systems Commissioning Administrator (SCA); ACG Certified Commissioning Authority (CxA); ICB/TABB Certified Commissioning Supervisor; BCA Certified Commissioning Professional (CCP); AEE Certified Building Commissioning Professional (CBCP); University of Wisconsin-Madison Qualified Commissioning Process Provider (QcxP); ASHRAE Commissioning Process Management Professional (CPMP).

a. Submit the Lead Commissioning Specialist's certification of qualifications including the name of the specialist and firm; certifications; years of experience; and a listing of representative projects of similar size and complexity no later than 30 calendar days after Notice to Proceed. Submit one hard copy and an electronic copy.

b. The Lead Commissioning Specialists certifications must be maintained for the entire duration of the duties specified herein. If, for any reason, the specialist loses a certification during this period, immediately notify the Contracting Officer's Representative and submit another Lead Commissioning Specialist for approval. All work specified in this specification section to be performed by the Lead Commissioning Specialist is invalid if the Lead Commissioning Specialist loses its certification prior to contract completion and must be performed by an approved successor.

c. The Lead Commissioning Specialist must lead and oversee the commissioning work specified herein and be the primary point of contact for the Government regarding the commissioning work.

1.7.2 Technical Commissioning Specialists

Technical Commissioning Specialists, employed by the Commissioning Firm and that have the following qualifications, must perform the technical work specified herein associated with each system to be commissioned:

a. The technical work associated with mechanical systems including Heating, Ventilating, Air Conditioning, and Refrigeration Systems; Building Automation System; Utility Monitoring and Control System; Service Water Heating Systems; Plumbing Systems must be performed by a Commissioning Specialist certified by NEBB, ACG, ICB/TABB, or BCA in the commissioning of HVAC systems with five years of experience in the commissioning of HVAC systems.
b. The technical work associated with electrical systems including Lighting Systems; Power Distribution Systems; must be performed by an engineering technician certified by the InterNational Electrical Testing Association (NETA) or the National Institute for Certification in Engineering Technologies (NICET) with five years of experience inspecting, testing, and calibrating electrical distribution and generation equipment, systems, and devices.

c. Submit the Technical Commissioning Specialist's certification of qualifications including the name of the specialist and firm; certifications; years of experience; and a listing of representative projects of similar size and complexity no later than 30 calendar days after Notice to Proceed. Submit one hard copy and an electronic copy.

1.7.3 Commissioning Standard

Comply with the requirements of the commissioning standard under which the Commissioning Firm and Specialists qualifications are approved. When the firm and specialists are certified by BCA, AEE, ASHRAE, or the University of Wisconsin-Madison, comply with the requirements of one of the acceptable standards unless otherwise stated herein. The acceptable standards are ACG Commissioning Guideline, NEBB Commissioning Standard, SMACNA 1429, or ASHRAE 202. Comply with applicable NETA and NICET testing standards for electrical systems.

a. Implement all recommendations and suggested practices contained in the Commissioning Standard and electrical test standards.

b. Use the Commissioning Standard for all aspects of Commissioning, including calibration of instruments.

c. Where the instrument manufacturer calibration recommendations are more stringent than those listed in the Commissioning Standard, adhere to the manufacturer calibration recommendations.

d. All quality assurance provisions of the Commissioning Standard such as performance guarantees are part of this contract.

e. The Commissioning Specialists must develop commissioning procedures for any systems or system components not covered in the Commissioning Standard.

f. Use any new requirements, recommendations, and procedures published or adopted prior to contract solicitation by the body responsible for the Commissioning Standard.

1.8 ISSUES LOG

The Lead Commissioning Specialist must develop and maintain an Issues Log for tracking and resolution of all deficiencies discovered through commissioning review, inspection, and testing. Include the date of final resolution of issues as confirmed by the Commissioning Specialist. Submit the Issues Log on a monthly basis at a minimum. At any point during construction, any commissioning team member finding deficiencies may communicate those deficiencies in writing to the Commissioning Specialist for inclusion into the Issues Log.
Track construction deficiencies identified in the Issues Log using QCS as specified and required by project conditions.

1.9 CERTIFICATE OF READINESS

Prior to scheduling Functional Performance Tests for each system, issue a Certificate of Readiness for the system certifying that the system is ready for Functional Performance Testing. The Certificate of Readiness must include, for each system to be commissioned, all equipment and system start-up reports; Performance Verification Test Reports; completed Pre-Functional Checklists; Testing, Adjusting, and Balancing (TAB) Report; HVAC Controls Start-Up Reports; and the Air Leakage Test Reports and Diagnostic Test Reports to the extent applicable to the system. The Contractor; the Lead Commissioning Specialist; the Contractor's Quality Control Representative; the Mechanical, Electrical, Controls, and TAB subcontractor representatives must sign and date the Certificate of Readiness. Submit the Certificate of Readiness for each system no later than 14 calendar days prior to Functional Performance Tests of that system. Submit one hard copy and an electronic copy. Do not schedule Functional Performance Tests for a system until the Certificate of Readiness for that system receives approval by the Government.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

3.1 CONSTRUCTION PHASE

3.1.1 Construction Commissioning Coordination Meeting

The Lead Commissioning Specialist must lead a Construction Commissioning Coordination Meeting no later than 14 days after approval of the Commissioning Firm and Commissioning Specialists to discuss the commissioning process including contract requirements, lines of communication, roles and responsibilities, schedules, documentation requirements, inspection and test procedures, and logistics as specified in this specification section. The Contractor's Superintendent or Project Manager, the Contractor's Quality Control Representative, and the Government must attend this meeting. Invite the User and a Directorate of Public Works Representative, to attend this meeting.

3.1.2 Construction Phase Commissioning Plan

3.1.2.1 Interim Construction Phase Commissioning Plan

The Lead Commissioning Specialist (CxC) must prepare the Interim Construction Phase Commissioning Plan. Submit the Interim Construction Phase Commissioning Plan no later than 30 calendar days after the Construction Commissioning Coordination Meeting and no later than 14 days prior to the start of construction of the building envelope. Submit one hard copy and an electronic copy.

Identify the commissioning and testing standards and outline the overall commissioning process, the commissioning schedule, the commissioning team members and responsibilities, lines of communication, documentation
requirement for the construction phase of the project in the Interim Construction Phase Commissioning Plan.

3.1.2.1 Checklists

Download example Pre-Functional Checklists, Functional Performance Test Checklists, and Integrated Systems Test Checklists for specification section 01 91 00.15 TOTAL BUILDING COMMISSIONING at the following location:
http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphics-

The checklists submitted in the Interim and Final Construction Phase Commissioning Plans must contain the same level of detail shown in the examples. The submitted checklists are not required to match the format of the examples.

3.1.2.2 Final Construction Phase Commissioning Plan

The Lead Commissioning Specialist (CxC) must prepare the Final Construction Phase Commissioning Plan. Submit the Final Construction Phase Commissioning Plan no later than 30 calendar days prior to the start of Pre-Functional Checks. Submit one hard copy and an electronic copy.

Include the information provided in the Interim Construction Phase Commissioning Plan. In addition, the Technical Commissioning Specialist must develop the Pre-Functional Checklists, Integrated Systems Test Checklists, and Functional Performance Test Checklists for each building, for each system required to be commissioned, and for each component for inclusion in the Final Construction Phase Commissioning Plan.

3.1.2.2.1 Pre-Functional Checklists

The Pre-Functional Checklists must include items for physical inspection or testing that demonstrate that installation and start-up of equipment and systems is complete. See paragraph Pre-Functional Checks for more information. Functional Performance and Integrated Systems Test test procedures must explain, step-by-step, the actions and expected results that will demonstrate that the system performs in accordance with the contract in the Functional Performance Test and Integrated Systems Test Checklists. See paragraph Functional Performance and Integrated Systems Tests for more information.

3.1.2.2.2 Functional Performance Test Checklists

Functional Performance Test Checklists must include procedures that explain, step-by-step, the actions and expected results that will demonstrate that the system performs in accordance with the contract. See paragraph Functional Performance and Integrated Systems Tests for more information. Include the following sections and details appropriate to the systems being tested in the Functional Performance Test Checklists:

a. Notable system features including information about controls to facilitate understanding of system operation

b. Conclusions and recommendations. Conclusions must clearly indicate if system does or does not perform in accordance with contract requirements. Recommendation must clearly indicate that the system should or should not be accepted by the Government.

c. Test conditions including date, beginning and ending time, and
beginning and ending outdoor air conditions

d. Attendees

e. Identification of the equipment involved in the test

f. Control system feature identification

g. Point-to-point observations including demonstrating system flow meters and sensors have been calibrated and are correctly displayed on the Operator work station

h. Actuator operation observations demonstrating actuator responses to commands from the control system

i. As-found condition of the system operation

j. List of test items with step numbers along with the corresponding feature or control operation, intended test procedure, expected system response, and pass/fail indication.

k. Space for comments for each test item.

3.1.2.2.3 Integrated Systems Test Checklists

Integrated Systems Test Checklists must include test procedures that explain, step-by-step, the actions and expected results that will demonstrate that the system performs in accordance with the contract. See paragraph Functional Performance and Integrated Systems Tests for more information. Include the following sections in the Integrated Systems Test Checklists:

a. Notable features of the interconnected systems organized by discipline including information to facilitate understanding of system operation

b. Conclusions and recommendations. Conclusions must clearly indicate if the systems do or do not perform in accordance with contract requirements. Recommendation must clearly indicate that the systems should or should not be accepted by the Government

c. Test conditions including date and beginning and ending time

d. Attendees

e. Identification of the equipment and systems involved in the test

f. List of test items with step numbers along with the corresponding feature or control operation, intended test procedure, expected system response, and pass/fail indication.

g. Space for comments for each test item.

3.1.3 Design Review

The Lead Commissioning Specialist and Technical Commissioning Specialists must review the construction contract plans and specifications, the Owner's Project Requirements, and the Basis of Design. The Owner's Project Requirements are attached as Appendix A. The Basis of Design is attached as Appendix B. The Owner's Project Requirements and Basis of Design
documents are not contract documents and are provided for commissioning review purposes only.

a. Advise the Contracting Officer's Representative of any discrepancies between the Basis of Design and Owner's Project Requirements, deficiencies of the design to comply with the Owner's Project Requirements or Basis of Design, and deficiencies that would prevent the building systems and features from operating or performing effectively and from being adequately maintainable.

b. The Commissioning Specialists must provide a Design Review Report individually listing each deficiency and the corresponding proposed corrective action necessary for proper system operation or performance. Submit one hard copy and an electronic copy of the report to the Contracting Officer's Representative no later than 14 days after approval of the Commissioning Specialists.

c. The Lead Commissioning Specialist must participate in a meeting to discuss any items contained in the report no later than 14 calendar days after submission of the report.

3.1.4 Construction Submittals

Provide all submittals associated with the systems to be commissioned, including shop drawings; equipment submittals; test plans, procedures, and reports; and resubmittal's to the Commissioning Specialists. The Technical Commissioning Specialist must review the submittals to the extent necessary verify that the equipment and system installation will comply with the contract requirements and the requirements of the Basis of Design and the Owner's Project Requirements.

3.1.5 Inspection and Testing

Demonstrate that all system components have been installed, that each control device and item of equipment operates, and that the systems operate and perform, including interactive operation between systems, in accordance with contract documents and the Owner's Project Requirements. Requirements in related specification sections are independent from the requirements of this section and do not satisfy any of the requirements specified in this specification section. Provide all materials, services, and labor required to perform the Pre-Functional Checks, Integrated Systems Tests, and Functional Performance Tests.

3.1.5.1 Commissioning Team

Provide a commissioning representative for each sub-contractor associated with the systems to be commissioned. Each commissioning representative is responsible for coordination of their respective sub-contractor's execution of the commissioning activities and participation in the inspection and testing required by this specification section. The designers listed below are the designers of record for their respective systems. Substitutes must be approved by the Contracting Officer's Representative.

3.1.5.1.1 Mechanical System Pre-Functional Checks Team

The following team members must participate in Pre-Functional checks of mechanical systems:
### Designation | Function
---|---
CxM | Mechanical System Technical Commissioning Specialist
QAR | Contracting Officer's Quality Assurance Representative
CQC | Contractor's Quality Control Personnel
MC | Contractor's Mechanical Commissioning Representative
EC | Contractor's Electrical Commissioning Representative
CC | Contractor's Controls Commissioning Representative
TABC | Contractor's TAB Commissioning Representative
PC | Contractor's Plumbing Commissioning Representative
IC | Contractor's Irrigation Commissioning Representative

#### 3.1.5.1.2 Electrical System Pre-Functional Checks Team

The following team members must participate in Pre-Functional checks of electrical systems:

<table>
<thead>
<tr>
<th>Designation</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>CxE</td>
<td>Mechanical System Technical Commissioning Specialist</td>
</tr>
<tr>
<td>QAR</td>
<td>Contracting Officer's Quality Assurance Representative</td>
</tr>
<tr>
<td>CQC</td>
<td>Contractor's Quality Control Personnel</td>
</tr>
<tr>
<td>EC</td>
<td>Contractor's Electrical Commissioning Representative</td>
</tr>
</tbody>
</table>

#### 3.1.5.1.3 Mechanical Systems Test Team

The following team members must participate in Functional Performance and Integrated Systems Testing of mechanical systems:

<table>
<thead>
<tr>
<th>Designation</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>CxM</td>
<td>Mechanical System Technical Commissioning Specialist</td>
</tr>
<tr>
<td>QAR</td>
<td>Contracting Officer's Quality Assurance Representative</td>
</tr>
<tr>
<td>CQC</td>
<td>Contractor's Quality Control Personnel</td>
</tr>
<tr>
<td>MC</td>
<td>Contractor's Mechanical Commissioning Representative</td>
</tr>
<tr>
<td>EC</td>
<td>Contractor's Electrical Commissioning Representative</td>
</tr>
</tbody>
</table>
3.1.5.1.4 Electrical Systems Test Team

The following team members must participate in Functional Performance and Integrated Systems Testing of electrical systems:

<table>
<thead>
<tr>
<th>Designation</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>CxE</td>
<td>Mechanical System Technical Commissioning Specialist</td>
</tr>
<tr>
<td>QAR</td>
<td>Contracting Officer's Quality Assurance Representative</td>
</tr>
<tr>
<td>CQC</td>
<td>Contractor's Quality Control Personnel</td>
</tr>
<tr>
<td>EC</td>
<td>Contractor's Electrical Commissioning Representative</td>
</tr>
</tbody>
</table>

3.1.5.1.5 Other Pre-Functional and Functional Performance Participants

The following may participate as team members during Pre-Functional Checks and Functional Performance Testing:

<table>
<thead>
<tr>
<th>Designation</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>DFW</td>
<td>Directorate of Public Works Representative</td>
</tr>
<tr>
<td>BCE</td>
<td>Base Civil Engineer Office Representative</td>
</tr>
<tr>
<td>RSC</td>
<td>Reserve Support Command Representative</td>
</tr>
<tr>
<td>PWD</td>
<td>Public Works Division Representative</td>
</tr>
<tr>
<td>User</td>
<td>Using Agent's Representative</td>
</tr>
</tbody>
</table>

3.1.5.2 Pre-Functional Checks

Pre-Functional Checklists from the approved Final Construction Phase Commissioning Plan must be completed by the commissioning team. Complete one Pre-Functional Checklist for each individual item of equipment or system for each system required to be commissioned including, but not limited to, ductwork, piping, equipment, fixtures (lighting and plumbing), and controls. Indicate commissioning team member inspection and acceptance of each Pre-Functional Checklist item by initials. Acceptance of each Pre-Functional Checklist item by each team member indicates that item
conforms to the construction contract requirements in their area of responsibility. Technical Commissioning Specialist acceptance of each Pre-Functional Checklist item indicates that each item has been installed correctly and in accordance with contract documents and the Owner's Project Requirements. Submit the completed and initialed Pre-Functional Checklists no later than 7 calendar days after completion of inspection of all checklists items for each system. Submit one hard copy and an electronic copy. Include manufacturer start-up checklists associated with equipment with the submission of the Pre-Functional Checklists.

3.1.5.3 Testing, Adjusting, and Balancing (TAB) Report and Field Acceptance Testing

The Mechanical System Technical Commissioning Specialist must review the pre-final TAB Report required by Specification Section 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC. Identify any deficiencies to the Contracting Officer's Representative and the Contractor's Quality Control Personnel. Resolve all deficiencies prior to TAB Field Acceptance Testing.

The Mechanical System Technical Commissioning Specialist must witness the TAB Field Acceptance Testing specified by Section 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC. Include a certification by the Mechanical Technical Specialist that no outstanding deficiencies exist in the systems relative to Testing, Adjusting, and Balancing with the final TAB Report submittal.

3.1.5.4 HVAC Controls Test Reports

The Mechanical System Technical Commissioning Specialist must review the Start-Up Testing Report and the PVT Procedures and Reports required by Specification Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC and 25 10 10 UTILITY MONITORING AND CONTROL SYSTEM (UMCS) Front End and Integration. Include a certification by the Mechanical System Technical Commissioning Specialist that the submittals contain no deficiencies or that the submittals do not indicate any deficiencies in the HVAC systems or HVAC control systems with each of these submittals.

3.1.5.5 Tests

3.1.5.5.1 Functional Performance and Integrated Systems Tests

Schedule Functional Performance Tests for each system only after the Certificate of Readiness has been approved by the Government for the system. Correct all deficiencies identified through any prior review, inspection, or test activity before the start of Functional Performance Tests. Perform Integrated Systems Tests only after the Functional Performance Tests for each associated system are completed with all deficiencies resolved and after the related Functional Performance Test Checklists have been signed by each commissioning team member.

a. Functional Performance Tests and Integrated Systems Tests must be performed with the Contracting Officer's Quality Assurance Representative present.

b. Abort Functional Performance Tests or Integrated Systems Tests when any system deficiency prevents the successful completion of the test.

c. Technical Commissioning Specialists must lead and document all Functional Performance Tests and Integrated Systems Tests for the
systems to be commissioned with the Contractor and appropriate sub-contractors performing the Functional Performance Tests and Integrated Systems Tests. The representatives listed in the paragraph Commissioning Team must attend the tests. Abort Functional Performance Tests or Integrated Systems Tests when any required commissioning team member is not present for the test.

3.1.5.5.1.1 Checklist

Use the Functional Performance Test and Integrated Systems Test Checklists from the approved Final Construction Phase Commissioning Plan to guide the Functional Performance Tests and Integrated Systems Tests. Functional Performance Tests must be performed for each item of equipment and each system required to be commissioned and verify all sensor calibrations, control responses, safeties, interlocks, operating modes, sequences of operation, capacities, lighting levels, and all other performance requirements comply with construction contract regardless of the specific items listed within the Functional Performance Test and Integrated Systems Test Checklists provided. Testing must progress from equipment or components to subsystems to systems to interlocks and connections between systems. Integrated Systems Tests must be performed for the interactive operation between systems such as HVAC systems, fire protection systems, back-up electrical supply, energy generation systems, and other systems, and verify correct interactive operation, acceptable speed of response, and other contract requirements for both normal and failure modes. Examples of Integrated Systems Tests include the correct operation of HVAC systems during emergency system activation, correct operation of uninterruptible power supplies or energy generators and connected systems, or lighting system operation during power outage or emergency system activation. The order of components and systems to be tested must be determined by the Technical Commissioning Specialists.

3.1.5.5.1.2 Acceptance

Indicate acceptance of each item of equipment and systems tested by signature of each commissioning team member for each Functional Performance Test or Integrated Systems Test Checklist. The Contractor's Quality Control Representative and the Technical Commissioning Specialists must indicate acceptance after the equipment and systems are free of deficiencies.

3.1.5.5.2 HVAC Test Methods

Perform Functional Performance Tests in accordance with the following:

3.1.5.5.2.1 Prior to Testing

Prior to testing operating modes, sequences of operation, interlocks, and safeties, complete control point-to-point observations, test sensor calibrations, and test actuator commands.

3.1.5.5.2.2 Simulating Conditions

Over-writing control input values through the controls system is not acceptable, unless approved by the Contracting Officer's Representative. Identify proposed exceptions in a protocol submitted to the Contracting Officer's Representative for approval. Before simulating conditions, overwriting values (if approved), or changing set-points, calibrate all sensors, transducers and devices. Below are several examples of exceptions...
that would be considered acceptable:

a. When varying static pressures inside ductwork can not be simulated within the duct, and where a sensor signals the controls system to initiate sequences at various duct static pressures, it is acceptable to simulate the various pressures with a Pneumatic Squeeze-Bulb Type Signaling Device with gauge temporarily attached to the sensing tube leading to the transmitter. It is not acceptable to reset the various set-points, nor to simulate an electric analog signal (unless approved as noted above).

b. Dirty filter pressure drops can be simulated using sheets of cardboard at filter face.

c. Freeze-stat safeties can be simulated by packing portion of sensor with ice.

d. High outside air temperatures can be simulated with a hair blower.

e. High entering cooling coil temperatures can be used to simulate entering cooling coil conditions.

f. Do not use signal generators to simulate sensor signals unless approved by the Contracting Officer's Representative, as noted above, for special cases.

g. Control set points can be altered. For example, to see the air conditioning compressor lockout work at an outside air temperature below 55 degrees F, when the outside air temperature is above 55 degrees F, temporarily change the lockout set point to be 0 degrees F above the current outside air temperature. Caution: Set points are not to be raised or lowered to a point such that damage to the components, systems, or the building structure and/or contents will occur.

h. Test duct mounted smoke detectors in accordance with the manufacturer's recommendations. Perform the tests with air system at minimum airflow condition in ductwork.

i. Test current sensing relays used for fan and pump status signals to control system to indicate unit failure and run status by resetting the set point on the relay to simulate a lost belt or unit failure while the unit is running. Confirm that the failure alarm was generated and received at the control system. After the test is conducted, return the set point to its original set-point or a set-point as indicated by the Contracting Officer's Representative.

3.1.5.5.2.3 Setup

Perform each test under conditions that simulate actual conditions as close as is practically possible. Provide all necessary materials and system modifications to produce the necessary flows, pressures, temperatures, and other conditions necessary to execute the test according to the specified conditions. At completion of the test, return the affected building equipment and systems to their pre-test condition.

3.1.5.5.3 Sample Strategy

Perform Functional Performance Tests using the following sample strategy. Prepare and complete a Functional Performance Test Checklist for each item.
of equipment or system to be tested. For sample sizes less than 100 percent for all similar equipment, the Government will select the specific equipment or system to be tested during testing. Equipment Identifiers are as indicated on the design drawings:

<table>
<thead>
<tr>
<th>Equipment Identifier</th>
<th>Sample Size (Percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AHU</td>
<td>100</td>
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<tr>
<td>Lighting Controls</td>
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Perform Integrated Systems Tests for all systems and equipment having interactive operation.

3.1.5.5.4 Seasonal Tests

3.1.5.5.4.1 Initial Functional Performance Tests

Perform Initial Functional Performance Tests as soon as all contract work is completed, regardless of the season. Develop and implement means of artificial loading to demonstrate, to a reasonable level of confidence, the ability of the HVAC systems to handle peak seasonal loads.

3.1.5.5.4.2 Full-Load Conditions

In addition to the Initial Functional Performance Tests, perform Functional Performance Tests of HVAC systems under full-load conditions during peak heating and cooling seasons during outdoor air condition design extremes. Test cooling equipment and systems with the building fully occupied when performing the Functional Performance Tests during peak cooling season.

Schedule Seasonal Functional Performance Tests in coordination with the Government.

3.1.5.5.4.3 System Acceptance

Systems may be partially accepted prior to seasonal testing if they comply with all construction contract that can be tested during initial Functional Performance Tests. All Functional Performance Test procedures must be completed prior to full systems acceptance.

3.1.5.5.5 Aborted Tests and Re-Testing

Abort Functional Performance Tests, Integrated Systems Tests, or Seasonal Tests if any deficiency prevents successful completion of the test or if any required commissioning team member is not present for the test. Reimburse the Government for all costs associated with effort lost due to
re-testing due to test failures and aborted tests. These costs must include salary, travel costs, and per diem for Government commissioning team members. Re-test only after all deficiencies identified during the original tests have been corrected.

3.1.5.5.5.1 100 Percent Sample

Systems or equipment for which 100 percent sample size are tested fail if one or more of the test procedures results in discovery of a deficiency and the deficiency cannot be resolved within 5 minutes during the test.

Re-test to the extent necessary to confirm that the deficiencies have been corrected without negatively impacting the performance of the rest of the system.

3.1.5.5.5.2 Less than 100 Percent Sample

For systems tests with a sample size less than 100 percent, if one or more of the test procedures for an item of equipment or a system results in discovery of a deficiency, regardless of whether the deficiency is corrected during the sample tests, the item of equipment or system fails the test.

a. If the system failure rate is 5 percent or less, meaning that 5 percent or less of the equipment or systems had at least one deficiency, re-test only on the items which experienced the initial failures.

b. If the system failure rate is higher than 5 percent, meaning that more than 5 percent of equipment or systems tested had at least one deficiency, re-test the items which experienced the initial failures to the extent necessary to confirm that the deficiencies have been corrected. In addition, test another random sample of the same size as the initial sample for the first time. If the second random sample set has any failures, re-test those failed items and all remaining equipment and systems to complete 100 percent testing of that system type.

3.1.6 Training Plan

Develop a training plan which identifies all training required by specification sections associated with commissioned systems. Include a matrix listing each training requirement, content of the training, the trainer name, trainer contact information, and schedule and location of training. Submit one hard copy and an electronic copy of the Training Plan to the Commissioning Specialists and the Government no later than 30 calendar days prior to the associated training.

Document training attendance using training attendance rosters and provide completed attendance rosters to the Commissioning Specialists and the Government no later than 7 calendar days following the completion of training for each system to be commissioned. Submit one hard copy and an electronic copy.

3.1.7 Systems Manual

Prepare and submit a Systems Manual including, for all commissioned systems, the Basis of Design, system single line diagrams, as-built sequences of operation and controls drawings, as-built control setpoints, recommended schedule for sensor and actuator calibration, recommended
schedule of maintenance when not in the O&M manuals, recommended re-testing schedule with proposed testing forms, and full equipment warranty information. Update and resubmit the Systems Manual based on any corrective action taken during the warranty period. The Technical Commissioning Specialists must review the Systems Manual. Include a signed certification or letter from the Lead Commissioning Specialist stating that the Systems Manual is complete, clear, and accurate with the submittal.

Submit Systems Manual no later than 30 calendar days following completion of Functional Performance Tests. Submit three hard copies and an electronic copy.

3.1.8 Maintenance and Service Life Plans

3.1.8.1 Maintenance Plan

Prepare and submit a Maintenance Plan for the project mechanical, electrical, plumbing, and fire protection systems. Prepare the HVAC and refrigeration sections of the Maintenance Plan in accordance with ASHRAE 180. Develop required inspection and maintenance tasks similar to Section 5 of ASHRAE 180 for the other commissioned systems and fire protection systems.

Submit the Maintenance Plan no later than 30 calendar days following the completion of Functional Performance tests. Submit three hard copies and an electronic copy.

3.1.8.2 Service Life Plan

Prepare and submit a Service Life Plan for the building envelope, structural systems, and site hardscape that includes the following for each assembly or component:

a. A description of each including the materials or products.

b. The estimated service life, in years.

c. The estimated maintenance frequency and description of maintenance tasks.

d. The point of maintenance access for the components with estimated service life less than service life of the building.

Submit the Service Life Plan no later than 30 calendar days following the completion of Functional Performance tests. Submit three hard copies and an electronic copy.

3.2 COMMISSIONING REPORT

Following the completion of Functional Performance Tests and Integrated Systems Tests, with the exception of Seasonal Tests, the Lead Commissioning Specialist must prepare a Commissioning Report.

a. Include an executive summary describing the overall commissioning process, the results of the commissioning process, any outstanding deficiencies and recommended resolutions, and any seasonal testing that must be scheduled for a later date. Indicate, in the executive summary, whether the systems meet the requirements of the construction contract and the Owner's Project Requirements.
b. Detail any deficiencies discovered during the commissioning process and the corrective actions taken in the report. Include the completed Pre-Functional Checklists, Functional Performance Test Checklists, Integrated Systems Test Checklists, the Commissioning Plans, the Issues Log, Performance Verification Test Reports, Training Attendance Rosters, the Design Review Report, the final TAB Report.

c. Submit the Commissioning Report no later than 14 calendar days following commissioning team acceptance of all Functional Performance Tests and Integrated Systems Tests with the exception of Seasonal Tests. Submit three hard copies and an electronic copy.

d. Following any Seasonal Tests or Post-Construction Activities, update the Final Commissioning Report to reflect any changes and resubmit.

3.3 POST-CONSTRUCTION SUPPORT

3.3.1 Post-Construction Endurance Test

Perform a one-week Endurance Test once during the peak heating season and once during the peak cooling season during outdoor air condition extremes using the building control system to trend all points shown as requiring a trend on the project schedules. If insufficient buffer capacity exists to trend the entire endurance test, upload trend logs during the course of the endurance test to ensure that no trend data is lost. Poll all points shown in the project schedules with an alarm condition at 5 minute intervals. Poll all points shown in the project schedules required for trending, overrides, or graphical displays at 15 minute intervals.

The Mechanical System Commissioning Specialists must review the trend logs from the Endurance Tests to ensure that the systems have stable operation and operate as required by the construction contract, and the Owner's Project Requirements. The Commissioning Specialists must provide a Post-Construction Trend Log Report that identifies any deficiencies noted in operation and includes a graphical representation of the trends. Provide one Trend Log Report for the peak cooling season and one Trend Log Report for the peak heating season. Submit one hard copy and one electronic copy of the Post-Construction Trend Log Reports no later than 14 calendar days following receipt of the trend log data by the Commissioning Specialist.

3.3.2 Post-Construction Site Visit

The Commissioning Specialists must visit the building site concurrent with the 9 month warranty inspection to inspect building system equipment and review building operation with the building operating/maintenance staff. The Commissioning Specialists must identify any deficiency of the building systems to operate in accordance with the contract requirements and the Owner's Project Requirements. The Commissioning Specialists must advise the Contracting Officer's Representative of any identified deficiencies and the proposed corrective action. Submit an updated commissioning report and systems manual documenting the results of the post-construction inspection.
APPENDIX A - OWNER'S PROJECT REQUIREMENTS
### Owner's Project Requirements Document

**Project:** Project, Location, PN ####

**Approved:**

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<th>Design Agent's Representative</th>
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6. Building Occupant and O&M Personnel Requirements
   a. Facility Operation
   b. UMCS (EMCS or FMCS)
   c. Occupant Training and Orientation
   d. O&M Staff Training and Orientation
1. Owner and User Requirements
   a. Primary Purpose, Program, and Use

   Explain the purpose, program, and use of the facility. (i.e. Army Reserve Center used for training reserve units. Training includes spaces such as weapons, medical, vehicle repair, cooking, etc.)

   b. Project History

   Explain the history of the project related to design/construction (i.e. D/B/B, D/B, IDIQ, JOC, COE in-house, A/E, etc.). Explain any additional project background that would impact energy/sustainability goals.

   c. Broad Goals

      i. Future Expansion: Explain goals related to potential future expansion.

      ii. Flexibility: Explain goals related to flexibility for layout and use of the building. (i.e. high rate of office churn, expected frequency of renovation, etc.)

      iii. Quality of Materials: Explain goals related to quality of materials. (i.e. highest quality materials, 50 yr life, 25 yr life, highest quality within budget, etc.)

      iv. Construction Costs: Explain goals related to construction costs. (i.e. how low can you go, set project amount, select simplest systems for low cost, etc.)

      v. Operational Costs: Explain goals related to operational costs. (i.e. low utilities based on water and energy conservation, trade-off allowable on maintenance costs to reduce utility cost, utility cost unimportant compared to construction cost, etc.)
2. Environmental and Sustainability Goals

   a. LEED/Green Globes Goal

       Set LEED/Green Globes goal and explain sustainable features permissible or preferred to be incorporated. Explain relative importance of LEED/Green Globes goal within project scope. Indicate requirement from service or agency specific criteria and policy.

   b. Other

       Explain any special sustainability or environmental goals associated with the project. Identify specific sustainability features that may be required or desired. (i.e. hydro-power, solar power, on-site water treatment, on-site water infiltration, impervious cover reduction, parking capacity, etc.)
3. Energy Efficiency Goals

a. Goals/Policy

   Explain the specific project goals and requirements regarding energy efficiency. Incorporate the requirements of UFC 1-200-02 High Performance and Sustainable Building Requirements and/or other relevant agency policies.

b. Systems and Feature Energy Impacts

   Identify and explain envelope, system, or site and building features that will be incorporated to maximize energy efficiency. Identify features that must be incorporated that will reduce or limit energy efficiency.
4. Indoor Environmental Quality Requirements

   a. Space Type 1

      i. Intended Use: Explain how the space will be used (i.e. classroom occasionally used as conference room).

      ii. Occupancy Schedule: Describe the occupancy including number of people at various times (i.e. drill weekend-maximum capacity, weekdays-20 percent; or 0700-0900 - none, 0900-1400 - 30 people, 1400-1600 - none).

      iii. Environmental Requirements: Describe the environmental requirements of the space. Include description of temperatures, humidity levels, ventilation rates, air quality, lighting levels, or any other specific parameters desired (i.e. 75 deg F, 50 percent rh, 30 fc, etc.).

      iv. Occupant System Control Ability: Describe the desired level of control the occupants will have over the thermal comfort and lighting systems. (i.e. adjustable thermostat for every person, adjustable thermostat in all private offices, no adjustable thermostats, adjustable thermostat in senior rank also controlling other offices, occupancy sensors for lighting, adjustable dimming, etc.)

      v. Type of Lighting: Describe the type of lighting desired (i.e. task lighting with minimal overhead, maximize daylight with dimming on overhead, accent lighting, particular fixtures, etc.).

      vi. After-hour Use Accommodations: Describe whether and how often the space may be used after hours. Describe the systems that activate when an occupant uses the building after-hours. Describe the level of control of after-hour use HVAC.

          (Example: Space is rarely used after-hours by few occupants. HVAC and lighting system should activate when occupants enter after-hours. The HVAC operation will be limited to that required to provide heating, A/C, and ventilation to the occupied space alone.) (Example: Space is rarely used after-hours by few occupants. Lighting and heating systems should activate. Ventilation and cooling should remain in normal after-hour operation.)

   b. Space Type 2
5. Equipment and System Expectations

a. HVAC Systems

i. Quality and Reliability: Explain the level of quality and reliability required of the HVAC systems.

(Example: Equipment efficiency should meet ASHRAE 90.1 and FEMP/Energy Star requirements. Due to critical nature of facility, additional redundancy in the cooling and heating systems is required, i.e. multiple chillers, boilers, and pumps.) (Example: No specific quality or reliability requirements specified. Equipment should remain serviceable over life of building or to the extent typical of the type of equipment.)

ii. Type: Explain the type of equipment desired.

(Example: Boilers should be condensing type. Use hydronic heating and cooling. Use self-contained A/C units in computer rooms.)

iii. Automation: Explain the level of automation in the HVAC System desired.

(Example: Single loop HVAC systems permissible. Use packaged controls only.) (Example: Control HVAC systems from DDC system connected to the base UMCS.) (Example: Boilers should have packaged controls connected to the DDC system.)

iv. Flexibility: Describe the desired level of flexibility of the HVAC system.

(Example: System should accommodate frequent office layout changes including private office wall movement.) (Example: Layout will remain mostly unchanged; no flexibility required.) (Example: Accommodate potential for conference and classrooms to change to offices.)

v. Maintenance Requirements: Describe the level of maintenance available or the requirements of the equipment regarding maintainability.

(Example: Equipment should be located to allow easy maintenance access. Equipment vendors or repair service should be able to respond within 24 hrs.)

b. Lighting Systems

i. Quality and Reliability: Explain the level of quality and reliability required of the lighting system controls.

(Example: The building lighting system should meet ASHRAE 90.1 - IP requirements.)

ii. Type: Explain the type of lighting or control equipment desired.

(Example: High-efficiency fluorescent lamps with high-efficiency ballasts will be specified. Indirect lighting will be used in all office and classroom spaces. Lighting foot-candle levels may be reduced to 45 foot-candles in lieu of the typical 50 foot-candles when indirect lighting is used.)

iii. Automation: Explain the level of automation in the lighting control
system desired.

(Example: Provide occupancy sensors in restrooms, corridors, and storage areas.)

iv. Flexibility: Describe the desired level of flexibility of the lighting system and control systems.

(Example: Provide dual level switching in classrooms and conference rooms.)

v. Maintenance Requirements: Describe the level of maintenance available or the requirements of the equipment regarding maintainability.

(Example: )

c. Domestic Hot Water Systems

i. Quality and Reliability: Explain the level of quality and reliability required of the domestic hot water systems.

(Example: Equipment efficiency should meet ASHRAE and FEMP/Energy Star requirements. Due to critical nature of facility, additional redundancy in the water heating systems is required, i.e. multiple hot water heaters and circulation pumps.) (Example: No specific quality or reliability requirements specified. Equipment should remain serviceable over life of building or to the extent typical of the type of equipment.)

ii. Type: Explain the type of equipment desired.

(Example: Gas-fired storage tank water heater with mixing valve for temperature control.) (Example: Instantaneous electric water heater at lavatories.) (Example: Instantaneous electric water heater with integral control system for eyewash/showers.)

iii. Automation: Explain the level of automation in the domestic hot water control system desired.

(Example: Occupancy schedule control for recirculation loop and gas burner. Connect package controls to DDC system.)

iv. Flexibility: Describe the desired level of flexibility of the domestic hot water systems.

(Example: No anticipated changes to restroom layout; no additional flexibility required.)

v. Maintenance Requirements: Describe the level of maintenance available or the requirements of the equipment regarding maintainability.

(Example: Equipment should be located to allow easy maintenance access. Equipment vendors or repair service should be able to respond within 24 hrs.)

d. On-site Power Systems

i. Quality and Reliability: Explain the level of quality and reliability required of the on-site power system.
ii. Type: Explain the type of on-site power system desired.

iii. Automation: Explain the level of automation in the on-site power system desired.

iv. Flexibility: Describe the desired level of flexibility of the on-site power system.

v. Maintenance Requirements: Describe the level of maintenance available or the requirements of the on-site power system regarding maintainability.

e. Other Systems

i. Quality and Reliability: Explain the level of quality and reliability required of the system.

ii. Type: Explain the type of system desired.

iii. Automation: Explain the level of automation in the system desired.

iv. Flexibility: Describe the desired level of flexibility of the system.

v. Maintenance Requirements: Describe the level of maintenance available or the requirements of the system regarding maintainability.
6. Building Occupant and O&M Personnel Requirements

   a. Facility Operation

       Describe how the facility will be operated. Who operates the facility? Who maintains the facility? Who pays the utility bills?

   b. UMCS (EMCS or FMCS)

       Will the building be tied to an UMCS/EMCS/FMCS? What system will be connected to? Provide information regarding connection requirements, protocols, and control, scheduling and monitoring points.

   c. Occupant Training and Orientation

       How much training and orientation is desired for building occupants? Will training need to be provided for all systems? To what extent do the occupants need to understand and use the systems?

   d. O&M Staff Training and Orientation

       How much training and orientation is desired for building occupants? Will training need to be provided for all systems? To what extent do the occupants need to understand and use the systems?
APPENDIX B - BASIS OF DESIGN
APPENDIX C - DESIGN PHASE COMMISSIONING PLAN

-- End of Section --
PART 1   GENERAL

1.1   SUMMARY

Perform all work in accordance with ACI 318.

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.

AMERICAN CONCRETE INSTITUTE INTERNATIONAL (ACI)

ACI 117 (2010; Errata 2011) Specifications for Tolerances for Concrete Construction and Materials and Commentary

ACI 301 (2016) Specifications for Structural Concrete

ACI 302.1R (2015) Guide for Concrete Floor and Slab Construction


ACI 318 (2014; Errata 1-2 2014; Errata 3-5 2015; Errata 6 2016; Errata 7 2017) Building Code Requirements for Structural Concrete and Commentary


ASTM INTERNATIONAL (ASTM)


ASTM A615/A615M (2016) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement


ASTM C172/C172M (2014a) Standard Practice for Sampling Freshly Mixed Concrete


ASTM C231/C231M (2017a) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method


ASTM C685/C685M (2014) Concrete Made by Volumetric Batching and Continuous Mixing


ASTM E1643  (2011; R 2017) Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs

ASTM E1745  (2017) Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs


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

40 CFR 247  Comprehensive Procurement Guideline for Products Containing Recovered Materials

1.3 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. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings
  Installation Drawings; G

SD-03 Product Data
  Air-Entraining Admixture
  Water-Reducing or Retarding Admixture
  Curing Materials

Waterstops

Conveying and Placing Concrete
  Mix Design Data; G
  Ready-Mix Concrete
  Curing Compound
  Mechanical Reinforcing Bar Connectors

SD-06 Test Reports
  Aggregates
  Concrete Mixture Proportions; G
  Measurement of Floor Tolerances
Compressive Strength Testing; SD-07 Certificates
Slump; SD-08 Manufacturer's Instructions
Air Content
Water
Cementitious Materials
Aggregates
Delivery Tickets
Curing Compound

1.4 QUALITY ASSURANCE

Indicate specific locations of Concrete Placement, Steel Reinforcement, Construction Joints (if applicable), and Contraction Joints on installation drawings and include, but not be limited to, square feet of concrete placements, thicknesses and widths, plan dimensions, and arrangement of cast-in-place concrete section.

1.4.1 Flatness and Levelness of Floor Slabs

Conduct floor flatness and levelness test, (FF and FL respectively), on floor slabs in accordance with the provisions set forth in ASTM E1155M or ASTM E1155. Make floor tolerance measurements by the approved laboratory and inspection service within 24 hours after completion of final troweling operation and before forms and shores have been removed. Provide results of floor tolerance tests, including formal notice of acceptance or rejection of the work, to the Contracting Officer within 24 hours after data collection.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

The Government retains the option to sample and test aggregates and concrete to determine compliance with the specifications. Provide facilities and labor as may be necessary to assist the Government in procurement of representative test samples. Obtain samples of aggregates at the point of batching in accordance with ASTM D75/D75M. Sample concrete in accordance with ASTM C172/C172M. Determine slump and air content in accordance with ASTM C143/C143M and ASTM C231/C231M, respectively, when cylinders are molded. Prepare, cure, and transport compression test specimens in accordance with ASTM C31/C31M. Test compression test specimens in accordance with ASTM C39/C39M. Take samples for strength tests not less than once each shift in which concrete is produced. Provide a minimum of five specimens from each sample; two to be tested at 28 days for acceptance, two will be tested at 7 days for information and one held in reserve.

2.1.1 Strength

Acceptance test results are the average strengths of two specimens tested
at 28 days. The strength of the concrete is considered satisfactory so long as the average of three consecutive acceptance test results equal or exceed the specified compressive strength, f\(^c\), but not more than 20 percent, and no individual acceptance test result falls below f\(^c\) by more than 500 psi.

2.1.2 Construction Tolerances

Apply a Class "C" finish to all surfaces except those specified to receive a Class "D" finish. Apply a Class "D" finish to all post-construction surfaces which will be permanently concealed. Surface requirements for the classes of finish required are as specified in ACI 117.

2.1.3 Concrete Mixture Proportions

Concrete mixture proportions are the responsibility of the Contractor. Mixture proportions must include the dry weights of cementitious material(s); the nominal maximum size of the coarse aggregate; the specific gravities, absorptions, and saturated surface-dry weights of fine and coarse aggregates; the quantities, types, and names of admixtures; and quantity of water per yard of concrete. Provide materials included in the mixture proportions of the same type and from the same source as will be used on the project. The specified compressive strength f\(^c\) is 4000 psi at 28 days. The maximum nominal size coarse aggregate is 1 inch, in accordance with ACI 304R. The air content for exterior concrete must be between 4.5 and 7.5 percent with a slump between 2 and 5 inches. The maximum water-cementitious material ratio is 0.45. Submit the applicable test reports and mixture proportions that will produce concrete of the quality required, ten days prior to placement of concrete.

2.2 MATERIALS

Submit manufacturer's literature from suppliers which demonstrates compliance with applicable specifications for the specified materials.

2.2.1 Cementitious Materials

Submit Manufacturer's certificates of compliance, accompanied by mill test reports, attesting that the concrete materials meet the requirements of the specifications in accordance with the Special Clause "CERTIFICATES OF COMPLIANCE". Also, certificates for all material conforming to EPA's Comprehensive Procurement Guidelines (CPG), in accordance with 40 CFR 247. Provide cementitious materials that conform to the appropriate specifications listed:

2.2.1.1 Portland Cement

ASTM C150/C150M, Type I or II with tri-calcium aluminates (C3A) content less than 10 percent and a maximum cement-alkali content of 0.80 percent Na2Oe (sodium oxide) equivalent.

2.2.2 Aggregates

For fine and coarse aggregates meet the quality and grading requirements of ASTM C33/C33M. Submit certificates of compliance and test reports for aggregates showing the material(s) meets the quality and grading requirements of the specifications under which it is furnished.
2.2.3 Admixtures

Provide admixtures, when required or approved, in compliance with the appropriate specification listed. Retest chemical admixtures that have been in storage at the project site, for longer than 6 months or that have been subjected to freezing, at the expense of the Contractor at the request of the Contracting Officer and will be rejected if test results are not satisfactory.

2.2.3.1 Air-Entraining Admixture

Provide air-entraining admixture that meets the requirements of ASTM C260/C260M.

2.2.3.2 Water-Reducing or Retarding Admixture

Provide water-reducing or retarding admixture meeting the requirements of ASTM C494/C494M, Type A, B, or D.

2.2.4 Water

Mixing and curing water in compliance with the requirements of ASTM C1602/C1602M; potable, and free of injurious amounts of oil, acid, salt, or alkali. Submit test report showing water complies with ASTM C1602/C1602M.

2.2.5 Reinforcing Steel

Provide reinforcing bars conforming to the requirements of ASTM A615/A615M, Grade 60, deformed. Provide welded steel wire reinforcement conforming to the requirements of ASTM A1064/A1064M. Detail reinforcement not indicated in accordance with ACI 301 and ACI SP-66. Provide mechanical reinforcing bar connectors in accordance with ACI 301 and provide 125 percent minimum yield strength of the reinforcement bar.

2.2.6 Form Coatings

Provide form coating in accordance with ACI 301.

2.2.7 Vapor Retarder

ASTM E1745 Class C polyethylene sheeting, minimum 15 mil thickness or other equivalent material with a maximum permeance rating of 0.04 perms per ASTM E96/E96M.

Consider plastic vapor retarders and adhesives with a high recycled content, low toxicity low VOC (Volatile Organic Compounds) levels.

2.2.8 Curing Materials

Provide curing materials in accordance with ACI 301, Section 5.

2.3 READY-MIX CONCRETE

Provide ready-mix concrete with mix design data conforming to ACI 301 Part 2. Submit delivery tickets in accordance with ASTM C94/C94M for each ready-mix concrete delivery, include the following additional information:.

a. Type and brand cement
b. Cement content in 94-pound bags per cubic yard of concrete

c. Maximum size of aggregate

d. Amount and brand name of admixture

e. Total water content expressed by water cementitious material ratio

2.4 ACCESSORIES

2.4.1 Waterstops

2.4.1.1 Hydrophilic Waterstop

Swellable strip type compound of polymer modified chloroprene rubber that swells upon contact with water conforming to ASTM D412 as follows: Tensile strength 420 psi minimum; ultimate elongation 600 percent minimum. Minimum hardness of 50 on the type A durometer and the volumetric expansion ratio in distilled water at 70 degrees F; 3 to 1 minimum.

2.4.2 Curing Compound

Provide curing compound conforming to ASTM C309. Submit manufactures instructions for placing curing compound.

PART 3 EXECUTION

3.1 PREPARATION

Prepare construction joints to expose coarse aggregate. The surface must be clean, damp, and free of laitance. Construct ramps and walkways, as necessary, to allow safe and expeditious access for concrete and workmen. Remove snow, ice, standing or flowing water, loose particles, debris, and foreign matter. Satisfactorily compact earth foundations. Make spare vibrators available. Placement cannot begin until the entire preparation has been accepted by the Government.

3.1.1 Embedded Items

Secure reinforcement in place after joints, anchors, and other embedded items have been positioned. Arrange internal ties so that when the forms are removed the metal part of the tie is not less than 2 inches from concrete surfaces permanently exposed to view or exposed to water on the finished structures. Prepare embedded items so they are be free of oil and other foreign matters such as loose coatings or rust, paint, and scale. The embedding of wood in concrete is permitted only when specifically authorized or directed. Provide all equipment needed to place, consolidate, protect, and cure the concrete at the placement site and in good operating condition.

3.1.2 Formwork Installation

Forms must be properly aligned, adequately supported, and mortar-tight. Provide smooth form surfaces, free from irregularities, dents, sags, or holes when used for permanently exposed faces. Chamfer all exposed joints and edges, unless otherwise indicated.
3.1.3 Vapor Retarder Installation

Install in accordance with ASTM E1643. Apply vapor retarder over gravel fill. Lap edges not less than 12 inches. Seal all joints with pressure-sensitive adhesive not less than 2 inches wide. Protect the vapor barrier at all times to prevent injury or displacement prior to and during concrete placement.

3.1.4 Production of Concrete

3.1.4.1 Ready-Mixed Concrete

Provide ready-mixed concrete conforming to ASTM C94/C94M except as otherwise specified.

3.1.4.2 Concrete Made by Volumetric Batching and Continuous Mixing

Conform to ASTM C685/C685M.

3.1.5 Waterstops

Install and splice waterstops as directed by the manufacturer.

3.2 CONVEYING AND PLACING CONCRETE

Convey and place concrete in accordance with ACI 301, Section 5.

3.2.1 Cold-Weather Requirements

Place concrete in cold weather in accordance with ACI 306R

3.2.2 Hot-Weather Requirements

Place concrete in hot weather in accordance with ACI 305R

3.3 FINISHING

3.3.1 Temperature Requirement

Do not finish or repair concrete when either the concrete or the ambient temperature is below 50 degrees F.

3.3.2 Finishing Formed Surfaces

Remove all fins and loose materials, and surface defects including filling of tie holes. Repair all honeycomb areas and other defects. Remove all unsound concrete from areas to be repaired. Ream or chip surface defects greater than 1/2 inch in diameter and holes left by removal of tie rods in all surfaces not to receive additional concrete and fill with dry-pack mortar. Brush-coat the prepared area with an approved epoxy resin or latex bonding compound or with a neat cement grout after dampening and filling with mortar or concrete. Use a blend of portland cement and white cement in mortar or concrete for repairs to all surfaces permanently exposed to view shall be so that the final color when cured is the same as adjacent concrete.

3.3.3 Finishing Unformed Surfaces

Finish unformed surfaces in accordance with ACI 301, Section 5.
3.3.3.1 Flat Floor Finishes

In accordance with ACI 302.1R, construct in accordance with one of the methods recommended in Table 7.15.3, "Typical Composite FF/FL Values for Various Construction Methods." ACI 117 for tolerances tested by ASTM E1155M or ASTM E1155. These requirements are based upon the latest FF/FL method.

3.3.3.1.1 Floor Slabs

Conform floor slabs on grade to the following ACI F-number requirements unless noted otherwise:

<table>
<thead>
<tr>
<th>Specified Overall Values</th>
<th>FF35/FL 25 minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Local Values</td>
<td>FF17/FL15 minimum</td>
</tr>
</tbody>
</table>

3.3.3.1.2 Subject to Vehicular Traffic

Floor slabs on grade subject to vehicular traffic or receiving thin-set flooring shall conform to the following ACI F-number requirements:

<table>
<thead>
<tr>
<th>Specified Overall Values</th>
<th>FF35/FL25 minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Local Values</td>
<td>FF25/FL17 minimum</td>
</tr>
</tbody>
</table>

3.3.3.2 Measurement of Floor Tolerances

Test floor slabs within 24 hours of the final troweling. Submit test results to Contracting Officer within 12 hours after collecting data. Floor flatness inspector must provide a tolerance report which includes:

a. Name of Project
b. Name of Contractor
c. Date of Data Collection
d. Date of Tolerance Report
e. A Key Plan Showing Location of Data Collected
f. Results Required by ASTM E1155M ASTM E1155
3.3.3.3 Expansion and Contraction Joints

Make expansion and contraction joints in accordance with the details shown or as otherwise specified. Provide 1/2 inch thick transverse expansion joints where new work abuts an existing concrete. Provide expansion joints at a maximum spacing of 30 feet on center in sidewalks, unless otherwise indicated. Provide contraction joints at a maximum spacing of 6 linear feet in sidewalks and at a maximum spacing of 15 feet in slabs (aspect ratio shall not exceed 2:1), unless otherwise indicated. Cut contraction joints at a minimum of 1 inch(es) deep with a jointing tool after the surface has been finished.

3.4 CURING AND PROTECTION

Cure and protect in accordance with ACI 301, Section 5.

3.5 FORM WORK

Provide form work in accordance with ACI 301, Section 2 and Section 5.

3.5.1 Removal of Forms

Remove forms in accordance with ACI 301, Section 2.

3.6 STEEL REINFORCING

Reinforcement must be free from loose, flaky rust and scale, and free from oil, grease, or other coating which might destroy or reduce the reinforcement's bond with the concrete.

3.6.1 Fabrication

Shop fabricate steel reinforcement in accordance with ACI 318 and ACI SP-66. Provide shop details and bending in accordance with ACI 318 and ACI SP-66.

3.6.2 Splicing

Perform splices in accordance with ACI 318 and ACI SP-66.

3.6.3 Supports

Secure reinforcement in place by the use of metal or concrete supports, spacers, or ties.

3.7 EMBEDDED ITEMS

Before placing concrete, take care to determine that all embedded items are firmly and securely fastened in place. Provide embedded items free of oil and other foreign matter, such as loose coatings of rust, paint and scale. Embedding of wood in concrete is permitted only when specifically authorized or directed.

3.8 TESTING AND INSPECTING

Report the results of all tests and inspections conducted at the project site informally at the end of each shift. Submit written reports weekly. Deliver within three days after the end of each weekly reporting period.
3.8.1 Field Testing Technicians

The individuals who sample and test concrete must have demonstrated a knowledge and ability to perform the necessary test procedures equivalent to the ACI minimum guidelines for certification of Concrete Field Testing Technicians, Grade I.

3.8.2 Preparations for Placing

Inspect foundation or construction joints, forms, and embedded items in sufficient time prior to each concrete placement to certify that it is ready to receive concrete.

3.8.3 Sampling and Testing

a. Obtain samples and test concrete for quality control during placement. Sample fresh concrete for testing in accordance with ASTM C172/C172M. Make six test cylinders.

b. Test concrete for compressive strength at 7 and 28 days for each design mix and for every 100 cubic yards of concrete. Test two cylinders at 7 days; two cylinders at 28 days; and hold two cylinders in reserve. Conform test specimens to ASTM C31/C31M. Perform compressive strength testing conforming to ASTM C39/C39M.

c. Test slump at the site of discharge for each design mix in accordance with ASTM C143/C143M. Check slump once during each shift that concrete is produced.

d. Test air content for air-entrained concrete in accordance with ASTM C231/C231M. Test concrete using lightweight or extremely porous aggregates in accordance with ASTM C173/C173M. Check air content at least once during each shift that concrete is placed.

e. Determine temperature of concrete at time of placement in accordance with ASTM C1064/C1064M. Check concrete temperature at least once during each shift that concrete is placed.

3.8.4 Action Required

3.8.4.1 Placing

Do not begin placement until the availability of an adequate number of acceptable vibrators, which are in working order and have competent operators, has been verified. Discontinue placing if any lift is inadequately consolidated.

3.8.4.2 Air Content

Whenever an air content test result is outside the specification limits, adjust the dosage of the air-entrainment admixture prior to delivery of concrete to forms.

3.8.4.3 Slump

Whenever a slump test result is outside the specification limits, adjust the batch weights of water and fine aggregate prior to delivery of concrete to the forms. Make the adjustments so that the water-cementitious material ratio does not exceed that specified in the submitted concrete mixture.
proportion and the required concrete strength is still met.

-- End of Section --
PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)


AASHTO M 251 (2006; R 2011) Standard Specification for Plain and Laminated Elastomeric Bridge Bearings

AMERICAN CONCRETE INSTITUTE INTERNATIONAL (ACI)

ACI 318 (2014; Errata 1-2 2014; Errata 3-5 2015; Errata 6 2016; Errata 7 2017) Building Code Requirements for Structural Concrete and Commentary

AMERICAN HARDBOARD ASSOCIATION (AHA)

AHA A135.4 (1995; R 2004) Basic Hardboard

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M (2015; Errata 1 2015; Errata 2 2016) Structural Welding Code - Steel

AWS D1.4/D1.4M (2011) Structural Welding Code - Reinforcing Steel

ASTM INTERNATIONAL (ASTM)


ASTM A615/A615M (2016) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement


ASTM C311/C311M (2013) Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland-Cement Concrete


1.2 MODIFICATION TO REFERENCE

In the ACI publications, reference to the "Building Official," the "Structural Engineer" and the "Architect/Engineer" must be interpreted to mean the Contracting Officer.

1.3 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. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Drawings of Precast Members; G

Drawings of Precast Prestressed Concrete Members; G
1.4 QUALITY ASSURANCE

1.4.1 Qualifications

1.4.1.1 Manufacturer Qualifications

PCI MNL-116. Plants must be certified by the PCI Plant Certification Program for Category C1 and/or C3 work. At the Contracting Officer's option, PCI Plant quality control program records must be available for review.

1.4.1.2 Erector Certification

Erector with erecting organization and all erecting crews certified and designated by PCI’s Certificate of Compliance to erect Category S2 (Complex Structural Systems).

1.4.1.3 Welding Qualifications

Provide AWS D1.1/D1.1M qualified welders who are currently certified at contract award date and have maintained their certificates over the past
1.4.2 Regulatory Requirements

Provide precast and/or prestressed members in conformance with ACI 318 and PCI MNL-120.

1.4.3 Concrete Mix Design

ACI 318. The minimum compressive strength of concrete at 28 days must be 5000 psi, unless otherwise indicated. Higher strengths are permissible. Add air-entraining admixtures at the mixer to produce between 4 and 6 percent air by volume.

1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Transportation

1.5.1.1 Transporting Members

Transport members in a manner to avoid excessive stresses that could cause cracking or other damage.

1.5.1.2 Lateral Deflection or Vibration

Any noticeable indication of lateral deflection or vibration during transportation must be corrected by rigid bracing between members or by means of lateral trussing.

1.5.2 Storage

1.5.2.1 Storage Areas

Storage areas for precast and/or prestressed members must be stabilized, and suitable foundations must be provided, so differential settlement or twisting of members will not occur.

1.5.2.2 Stacked Members

Stack members with adequate dunnage and bracing to control cracking, distortion, warping or other physical damage. Stack members such that lifting devices will be accessible and undamaged.

1.5.3 Handling of Members

The location of pickup points for handling of the members and details of the pickup devices must be shown in shop drawings. Members must be handled only by means of approved devices at designated locations. Members must be maintained in an upright position at all times and picked up and supported as shown in approved shop drawings.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

The work includes the provision of precast non-prestressed concrete herein referred to as precast members and/or precast, prestressed concrete herein referred to as prestressed members. Precast and Prestressed members must
be the product of a manufacturer specializing in the production of precast prestressed concrete members.

2.1.1  Design Requirements

Design precast and/or prestressed members in accordance with ACI 318 and the PCI MNL-120. Design precast and/or prestressed members (including connections) for the design load conditions and spans indicated, and handling and erection stresses, and for additional loads imposed by openings and supports of the work of other trades. Design precast and/or prestressed members for handling without cracking in accordance with the PCI MNL-120.

2.1.1.1  Loads

Loadings for members and connections must include all dead load, live load, applicable lateral loads such as wind and earthquake, applicable construction loads such as handling, erection loads, and other applicable loads.

2.1.1.2  Drawing and Design Calculation Information

Submit drawings and design calculations indicating complete information for the fabrication, handling, and erection of the precast and/or prestressed member. Include a cover page with the design calculations, signed and sealed by the registered professional engineer licensed in the state of Mississippi who prepared the design. Drawings must not be reproductions of contract drawings. Design calculations, drawings of precast members, and drawings of precast prestressed concrete members (including connections) must be made by a registered professional engineer experienced in the design of precast prestressed concrete members, and submitted for approval prior to fabrication. The drawings must indicate, as a minimum, the following information:

a. Plans, elevations and other drawing views showing the following:

   (1) Member piece marks locating and defining products furnished by the manufacturer.

   (2) Headers for openings.

   (3) Location and size of openings that cut prestressing strands or require the location of prestressing strands to miss field cut openings.

   (4) Relationships to adjacent material.

   (5) Joints and openings between members and between members and other construction.

   (6) Location of field installed anchors.

   (7) Erection sequences and handling requirements.

   (8) Lifting and erection inserts.

b. Elevations, sections and other details for each member showing the following:
(1) Connections between members and connections between members and other construction.

(2) Connections for work of other trades and cast-in items and their relation to other trades.

(3) Dimensioned size and shape for each member with quantities, position and other details of reinforcing steel, anchors, inserts and other embedded items.

(4) Lifting, erection and other handling devices and inserts.

(5) Surface finishes of each member.

(6) Estimated cambers

c. Magnitude, schedule and sequence of tensioning and detensioning prestressing strands.

d. Strength properties for concrete, steel and other materials.

e. Methods for storage and transportation.

f. Description of loose, cast-in and field hardware.

g. All dead, live, handling, erection and other applicable loads used in the design.

h. Signature and seal of the registered design professional who prepared the design.

2.2 MATERIALS

2.2.1 Material Sustainability Criteria

For products in this section, where applicable and to extent allowed by performance criteria, provide and document the following in accordance with Section 01 33 29 SUSTAINABILITY REQUIREMENTS:

a. Recycled content for fly ash

2.2.2 Cementitious Materials

For exposed concrete, use one manufacturer and one source for each type of cement, ground slag, fly ash, and pozzolan.

2.2.2.1 Fly Ash

ASTM C618, Class F, except that the maximum allowable loss on ignition must not exceed 3 percent. Class F fly ash for use in mitigating Alkali-Silica Reactivity must have a Calcium Oxide (CaO) content of less than 8 percent and a total equivalent alkali content less than 1.5 percent.

Add with cement. Fly ash content must be a maximum of 20 percent by weight of cementitious material. Report the chemical analysis of the fly ash in accordance with ASTM C311/C311M. Evaluate and classify fly ash in accordance with ASTM D5759.
2.2.2.2 Portland Cement

Provide cement that conforms to ASTM C150/C150M, Type I or II, with tri-calcium aluminates (C3A) content less than 10 percent and a maximum cement-alkali content of 0.80 percent Na2Oe (sodium oxide) equivalent. Use one brand and type of cement for formed concrete having exposed-to-view finished surfaces.

2.2.3 Water

Water must comply with the requirements of ASTM C1602/C1602M. Minimize the amount of water in the mix. Improve workability by adjusting the grading rather than by adding water. Water must be potable; free from injurious amounts of oils, acids, alkalis, salts, organic materials, or other substances deleterious to concrete. Submit test report showing water complies with ASTM C1602/C1602M.

2.2.4 Aggregates

ASTM C33/C33M, except as modified herein. Furnish aggregates for exposed concrete surfaces from one source. Provide aggregates that do not contain any substance which may be deleteriously reactive with the alkalies in the cement. Submit test report showing compliance with ASTM C33/C33M.

2.2.5 Grout

2.2.5.1 Nonshrink Grout

ASTM C1107/C1107M.

2.2.5.2 Cementitious Grout

Must be a mixture of portland cement, sand, and water. Proportion one part cement to approximately 2.5 parts sand, with the amount of water based on placement method. Provide air entrainment for grout exposed to the weather.

2.2.6 Admixtures

2.2.6.1 Air-Entraining

ASTM C260/C260M.

2.2.6.2 Accelerating

ASTM C494/C494M, Type C or E.

2.2.6.3 Water Reducing

ASTM C494/C494M, Type A, E, or F.

2.2.7 Reinforcement

2.2.7.1 Reinforcing Bars

ASTM A615/A615M, Grade 60.
2.2.7.2 Wire
ASTM A1064/A1064M.

2.2.7.3 Welded Wire Reinforcement
ASTM A1064/A1064M.

2.2.7.4 Supports for Concrete Reinforcement
Include bolsters, chairs, spacers, and other devices necessary for proper spacing, supporting, and fastening reinforcement bars and wire in place.
Ensure legs of supports in contact with formwork for sections that will be exposed to weather are hot-dip galvanized after fabrication, plastic coated, or corrosion-resistant steel bar supports.

2.2.8 Prestressing Strands
Uncoated, 7-wire strand stress- relieved, ASTM A416/A416M, Grade 250 or 270.
Single wire stress- relieved, ASTM A421/A421M for low relaxation wire.

2.2.9 Metal Accessories
Provide ASTM A123/A123M or ASTM A153/A153M galvanized.

2.2.9.1 Inserts
ASTM A47/A47M, Grade 32510, or ASTM A27/A27M Grade 60-30. Submit product data.

2.2.9.2 Structural Steel
ASTM A36/A36M.

2.2.9.3 Bolts
ASTM A325.

2.2.9.4 Nuts
ASTM A563.

2.2.9.5 Washers

2.2.10 Bearing Pads
Submit product data for all bearing pads being used.

2.2.10.1 Elastomeric
AASHTO M 251, for plain neoprene bearings.
2.2.10.2  Hardboard (Interior Only)
AHA A135.4, class as specified by the precast manufacturer.

2.2.10.3  Random-Oriented, Fiber-Reinforced Elastomeric Pads
Preformed, randomly oriented synthetic fibers set in elastomer. Surface hardness of 70 to 90 Shore A durometer according to ASTM D2240. Capable of supporting a compressive stress of 3000 psi with no cracking, splitting or delaminating in the internal portion of the pad.

2.2.10.4  Cotton-Duck-Fabric-Reinforced Elastomeric Pads
Preformed, horizontally layered cotton-duck fabric bonded to an elastomer. Surface hardness of 80 to 100 Shore A durometer according to ASTM D2240. Conforming to Division II, Section 18.10.2 of AASHTO LRFDCONS Bridge Design Specifications or Military Specification MIL-C-882.

2.2.10.5  High-Density Plastic
Multimonomer, nonleaching, plastic strip capable of supporting loads with no visible overall expansion.

2.3  PRODUCTION QUALITY CONTROL PROCEDURES
PCI MNL-116 unless specified otherwise. Submit quality control procedures established in accordance with PCI MNL-116 by the precast manufacturer.

2.3.1  Forms
Brace forms to prevent deformation. Forms must produce a smooth, dense surface. Use forms and form-facing materials that are nonreactive with concrete such as wood, metal, plastic, or other approved materials. Conform to the shapes, lines, and dimensions indicated and are within the limits of the specified fabrication tolerances. Chamfer exposed edges of columns and beams 3/4 inch, unless otherwise indicated. Provide threaded or snap-off type form ties.

2.3.2  Tolerances
Fabricate structural precast concrete members of shapes, lines and dimensions indicated, so each finished member complies with PCI MNL-135 product tolerances as well as position tolerances for cast-in items.

2.3.3  Reinforcement Placement
ACI 318 and PCI MNL-116 for placement and splicing. Place and secure steel bars, welded-wire reinforcement, and other reinforcement by means of metal bar supports and spacers. Reinforcement may be preassembled before placement in forms.

2.3.4  Built-In Anchorage Devices
Position, anchor, and locate anchorage devices where they do not affect the position of the main reinforcement or placing concrete. Bearing plates; set level, aligned properly, and anchored in the exact location indicated.
2.3.5 Lifting Devices

Provide lifting devices designed for 100-percent impact, and of materials sufficiently ductile to ensure visible deformation before fracture.

2.3.6 Blockouts

Provide blockouts as indicated.

2.3.7 Identification Markings

Clearly mark each structural section in a permanent manner to indicate its location and orientation in the building and the pickup points.

Ensure each structural section has the date of casting plainly indented in the unexposed face of the concrete.

2.3.8 Concrete

2.3.8.1 Concrete Mixing

ASTM C94/C94M. Mixing operations must produce batch-to-batch uniformity of strength, consistency, and appearance.

2.3.8.2 Concrete Placing

PCI MNL-116.

2.3.8.3 Concrete Curing

PCI MNL-116.

2.3.9 Surface Finish

Repairs located in a bearing area must be approved by the Contracting Officer prior to repairs. Defects must be repaired or rejected as specified in paragraph ACCEPTANCE/REJECTION OF DEFECTS.

2.3.9.1 Unformed Surfaces

Provide a steel troweled finish.

2.3.9.2 Formed Surfaces

PCI MNL-116, Appendix C, for grades of surface finishes.

a. Unexposed Surfaces: Provide a standard grade surface finish.

b. Exposed Surfaces: Provide a finish Grade B surface finish.

2.3.10 Acceptance/Rejection of Defects

2.3.10.1 Minor Defects

All honeycombed areas, chipped corners, air pockets over 1/4 inch in diameter, and other minor defects involve less than 36 square inches of concrete must be repaired. Form offsets of fins over 1/8 inch must be ground smooth. All unsound concrete must be removed from defective areas prior to repairing. All surfaces permanently exposed to view must be
repaired by a blend of portland cement and white cement properly proportioned so that the final color when cured will be the same as adjacent concrete. Precast or prestressed members containing hairline cracks which are visible and are less than 0.01 inches in width, may be accepted, except that cracks larger than 0.005 inches in width for surfaces exposed to the weather must be repaired.

2.3.10.2 Major Defects

Major defects are those which involve more than 36 square inches of concrete or expose stressing tendons or reinforcing steel. If one or more major defects appear in a member, it will be rejected. Cracks of a width of more than 0.01 inch will be cause for rejection of the member.

2.4 TESTS, INSPECTIONS, AND VERIFICATIONS

2.4.1 Factory Inspection

At the option of the Contracting Officer, precast and prestressed units may be inspected by the Contracting Officer prior to being transported to the job site. The Contractor must give notice 14 days prior to the time the units will be available for plant inspection. Neither the exercise nor waiver of inspection at the plant will affect the Government's right to enforce contractual provisions after units are transported or erected.

PART 3 EXECUTION

3.1 EXAMINATION

Prior to erection, and again after installation, precast and prestressed members must be checked for damage, such as cracking, spalling, and honeycombing. As directed by the Contracting Officer, precast and prestressed members that do not meet the surface finish requirements specified in paragraph SURFACE FINISH must be repaired, or removed and replaced with new precast and prestressed members.

3.2 ERECTION

Precast and prestressed members must be erected after the concrete has attained the specified compressive strength, unless otherwise approved by the precast manufacturer. Erect in accordance with the approved shop drawings. PCI MNL-135 for tolerances. Provide a 1:500 tolerance, if no tolerance is specified. Brace precast and/or prestressed members. Follow the manufacturer's recommendations for maximum construction loads. Place precast and/or prestressed members level, plumb, square, and true within tolerances. Align member ends.

3.3 BEARING SURFACES

Must be flat, free of irregularities, and properly sized. Size bearing surfaces to provide for the indicated clearances between the precast and/or prestressed member and adjacent precast and/or prestressed members or adjoining field placed surfaces. Correct bearing surface irregularities with nonshrink grout. Provide bearing pads where indicated or required. Do not use hardboard bearing pads in exterior locations. Place precast and/or prestressed members at right angles to the bearing surface, unless indicated otherwise, and draw-up tight without forcing or distortion, with sides plumb.
3.4 ANCHORAGE

Provide anchorage for fastening work in place. Conceal fasteners where practicable. Make threaded connections up tight and nick threads to prevent loosening.

3.5 WELDING

AWS D1.1/D1.1M, AWS D1.4/D1.4M for welding connections and reinforcing splices. Do not weld prestressing strands. Protect the concrete and other reinforcing from heat during welding. Weld continuously along the entire area of contact. Welding of epoxy-coated reinforcing is not allowed.

3.6 OPENINGS

Holes or cuts requiring reinforcing or prestressing steel to be cut, which are not indicated on the approved shop drawing, must only be made with the approval of the Contracting Officer and the precast manufacturer. Drill holes less than 12 inches in diameter with a diamond tipped core drill. Ensure cuts are straight and at 90 degrees to the surfaces without breaking or spalling the edges.

3.7 GALVANIZING REPAIR

Repair damage to galvanized coatings using ASTM A780/A780M zinc rich paint for galvanized surfaces damaged by handling, transporting, cutting, welding, bolting, or acid washing. Do not heat surfaces to which repair paint has been applied.

3.8 GROUTING

Clean and fill keyways between precast and/or prestressed members, and other indicated areas, solidly with nonshrink grout or cementitious grout. Provide reinforcing where indicated. Remove excess grout before hardening.

3.9 SEALANTS

Provide as indicated and as specified in Section 07 92 00 JOINT SEALANTS.

3.10 PROTECTION AND CLEANING

Protect exposed-to-view surfaces against staining and other damage until completion of the work.

Upon completion of installation, swept clean and leave ready slab surfaces to receive concrete floor topping, roofing, or other covering.

3.11 CONSTRUCTION RECORDS

Complete construction records must be kept of the manufacturing, handling, and erection of the precast-prestressed concrete members and submitted. Records must be kept for, but not limited to, the following items:

a. Specifications of material used in the manufacture of the members.

b. Time-temperature history of the concrete members from casting to the transfer of the prestress force.

c. Records of the tendon stressing operation including initial prestress
force, measured elongation, how it was measured, and how the tendons were stressed and destressed.

d. Records of inspection of the members before and after the prestress force is transferred to the members.

e. Records of the inspection of the members each time they are moved.

f. Records of any defects in the member and any corrective measures taken.

-- End of Section --
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 CONCRETE INSTITUTE INTERNATIONAL (ACI)


ASTM INTERNATIONAL (ASTM)


ASTM A615/A615M (2016) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

ASTM A653/A653M (2017) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process


ASTM A996/A996M (2016) Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement


ASTM C90 (2016) Standard Specification for Loadbearing Concrete Masonry Units

ASTM D2000 (2012; R 2017) Standard Classification System for Rubber Products in Automotive Applications

ASTM D2287 (2012) Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds


THE MASONRY SOCIETY (TMS)

TMS MSJC (2011) Masonry Standard Joint Committee's (MSJC) Book - Building Code Requirements and Specification for Masonry Structures,
1.2 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. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Cut CMU Drawings; G
Reinforcement Detail Drawings; G

SD-03 Product Data

Hot Weather Procedures; G
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Cement; G
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SD-04 Samples

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Concrete Masonry Units (CMU); G
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Clay or Shale Brick
Concrete Masonry Units (CMU)

Cementitious Materials
Admixtures for Masonry Mortar
Admixtures for Grout
1.3 QUALITY ASSURANCE

1.3.1 Masonry Mock-Up Panels

1.3.1.1 Mock-Up Panel Location

After material samples are approved and prior to starting masonry work, construct a mock-up panel for each type and color of masonry required. At least 48 hours prior to constructing the panel or panels, submit written notification to the Contracting Officer. Do not build-in mock-up panels as part of the structure; locate mock-up panels where directed. Construct portable mock-up panels or locate in an area where they will not be disrupted during construction.

1.3.1.2 Mock-Up Panel Configuration

Construct mock-up panels L-shaped or otherwise configured to represent all of the wall elements. Construct panels of the size necessary to demonstrate the acceptable level of workmanship for each type of masonry represented on the project. Provide a straight panel or a leg of an L-shaped panel of minimum size 8 feet long by 4 feet high.

1.3.1.3 Mock-Up Panel Composition

Show full color range, texture, and bond pattern of the masonry work. Demonstrate mortar joint tooling; grouting of reinforced vertical cores, collar joints, bond beams, and lintels; positioning, securing, and lapping of reinforcing steel; positioning and lapping of joint reinforcement (including prefabricated corners); and cleaning of masonry work during the construction of the panels. Also include installation or application procedures for anchors, wall ties, CMU control joints, brick expansion joints, flashing, brick soldier, row lock courses and weeps. Include a a masonry bonded corner, a stacked bond corner, a bond beam corner and installation of electrical boxes and conduit. When the panel represents reinforced masonry, include a 2 by 2 foot opening placed at least 2 feet above the panel base and 2 feet away from all free edges, corners, and control joints. Provide required reinforcing around this opening as well as at wall corners and control joints.

1.3.1.4 Mock-Up Panel Construction Method

Where anchored veneer walls or cavity walls are required, demonstrate and receive approval for the method of construction; i.e., either bring up the
two wythes together or separately, with the insulation and appropriate ties placed within the specified tolerances across the cavity. Demonstrate provisions to preclude mortar or grout droppings in the cavity and to provide a clear open air space of the dimensions shown on the drawings. Where masonry is to be grouted, demonstrate and receive approval on the method that will be used to bring up the masonry wythes; support the reinforcing bars; and grout cells, bond beams, lintels, and collar joints using the requirements specified herein. When water-repellent is specified to be applied to the masonry, apply the approved product to the mock-up panel. Construct panels on a properly designed concrete foundation.

1.3.1.5 Mock-Up Panel Purpose

The completed panels is used as the standard of workmanship for the type of masonry represented. Do not commence masonry work until the mock-up panel for that type of masonry construction has been completed and approved. Protect panels from the weather and construction operations until the masonry work has been completed and approved. Perform cleaning procedures on the mockup and obtain approval of the Contracting Officer prior to cleaning the building. After completion of the work, completely remove the mock-up panels, including all foundation concrete, from the construction site.

1.4 DELIVERY, STORAGE, AND HANDLING

Deliver, store, handle, and protect material to avoid chipping, breakage, and contact with soil or contaminating material. Store and prepare materials in already disturbed areas to minimize project site disturbance and size of project site.

1.4.1 Masonry Units

Cover and protect masonry units from precipitation. Conform to handling and storage requirements of TMS MSJC.

1.4.2 Reinforcement, Anchors, and Ties

Store steel reinforcing bars, coated anchors, ties, and joint reinforcement above the ground. Maintain steel reinforcing bars and uncoated ties free of loose mill scale and loose rust.

1.4.3 Cementitious Materials, Sand and Aggregates

Deliver cementitious and other packaged materials in unopened containers, plainly marked and labeled with manufacturers' names and brands. Store cementitious material in dry, weathertight enclosures or completely cover. Handle cementitious materials in a manner that will prevent the inclusion of foreign materials and damage by water or dampness. Store sand and aggregates in a manner to prevent contamination and segregation.

1.5 PROJECT/SITE CONDITIONS

Conform to TMS MSJC for hot and cold weather masonry erection.

1.5.1 Hot Weather Procedures

When ambient air temperature exceeds 100 degrees F, or exceeds 90 degrees F
and the wind velocity is greater than 8 mph, comply with TMS MSJC Article 1.8 D for: preparation prior to conducting masonry work; construction while masonry work is in progress; and protection for newly completed masonry.

1.5.2 Cold Weather Procedures

When ambient temperature is below 40 degrees F, comply with TMS MSJC Article 1.8 C for: preparation prior to conducting masonry work; construction while masonry work is in progress; and protection for newly completed masonry.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

2.1.1 Design - Specified Compressive Strength of Masonry

The specified compressive strength of masonry, f'm, is 2000psi.

2.1.2 Performance - Verify Masonry Compressive Strength

Verify specified compressive strength of masonry using the "Prism Test Method" of TMS MSJC when the "Unit Strength Method" cannot be used. Submit test results.

2.2 MANUFACTURED UNITS

2.2.1 General Requirements

Do not change the source of materials, which will affect the appearance of the finished work, after the work has started except with Contracting Officer's approval. Submit test reports from an approved independent laboratory. Certify test reports on a previously tested material as the same materials as that proposed for use in this project. Submit certificates of compliance stating that the materials meet the specified requirements.


2.2.2 Clay or Shale Brick

2.2.2.1 General

2.2.2.1.1 Sample Submittal

Submit brick samples as specified, showing the color range and texture of clay or shale brick. Limit units used on the project to those that conform to the approved sample. Submit sample of colored mortar with applicable masonry unit and color samples of three stretcher units and one unit for each type of special shape.

2.2.2.1.2 Uniformity

Deliver clay or shale brick units factory-blended to provide a uniform
2.2.2.1.3 Efflorescence Test

Test clay brick that will be exposed to weathering for efflorescence in accordance with ASTM C67. Schedule tests far enough in advance of starting masonry work to permit retesting if necessary. Units meeting the definition of "effloresced" are subject to rejection.

2.2.2.2 Solid Clay or Shale Brick

Provide solid clay or shale brick that conforms to ASTM C216, Type FBS. Where brick cores, recesses, or deformation would be exposed to view, provide 100 percent solid units. Provide brick with texture and color range to match the brick indicated.

Provide brick with specified sizes.

a. Modular size, 3-5/8 inches thick, 2-1/4 inches high, and 7-5/8 inches long.

2.2.3 Concrete Units

2.2.3.1 Aggregates

Test lightweight aggregates, and blends of lightweight and heavier aggregates in proportions used in producing the units, for stain-producing iron compounds in accordance with ASTM C641, visual classification method. Do not incorporate aggregates for which the iron stain deposited on the filter paper exceeds the "light stain" classification.

2.2.3.2 Concrete Masonry Units (CMU)

2.2.3.2.1 Cement

Use only cement that has a low alkali content and is of one brand.

2.2.3.2.2 Recycled Content

Provide units with a minimum of 5 percent post-consumer recycled content, or a minimum of 20 percent post-industrial recycled content, based on mass, cost, or volume. Units may contain post-consumer or post-industrial recycled content.

2.2.3.2.3 Size

Provide units with nominal dimension of 8 inches wide, 8 inches high, and 16 inches long.

2.2.3.2.4 Surfaces

Provide units with exposed surfaces that are smooth and of uniform texture.

2.2.3.2.5 Unit Types

2.2.3.2.6 Jamb Units

Provide jamb units of the shapes and sizes to conform with wall units.

Provide sash jamb units with a 3/4 by 3/4 inch groove near the center at end of each unit.

2.3 EQUIPMENT

2.3.1 Vibrators

Maintain at least one spare vibrator on site at all times.

2.3.2 Grout Pumps

Pumping through aluminum tubes is not permitted.

2.4 MATERIALS

2.4.1 Mortar Materials

2.4.1.1 Cementitious Materials

Provide cementitious materials that conform to those permitted by ASTM C270.

2.4.1.2 Hydrated Lime and Alternates

Provide lime that conforms to one of the materials permitted by ASTM C207 for use in combination with portland cement, hydraulic cement, and blended hydraulic cement. Do not use lime in combination with masonry cement or mortar cement.

2.4.1.3 Admixtures for Masonry Mortar

In cold weather, use a non-chloride based accelerating admixture that conforms to ASTM C1384, unless Type III portland cement is used in the mortar.

2.4.1.4 Aggregate and Water

Provide aggregate (sand) and water that conform to materials permitted by ASTM C270.

2.4.2 Grout and Ready-Mix Grout Materials

2.4.2.1 Cementitious Materials for Grout

Provide cementitious materials that conform to those permitted by ASTM C476.

2.4.2.2 Admixtures for Grout

Water-reducing admixtures that conform to ASTM C494/C494M Type F or G and viscosity-modifying admixtures that conform to ASTM C494/C494M Type S are permitted for use in grout. Other admixtures require approval by the Contracting Officer.

In cold weather, a non-chloride based accelerating admixture may be used.
subject to approval by the Contracting Officer; use accelerating admixture that is non-corrosive and conforms to ASTM C494/C494M, Type C.

2.4.2.3 Aggregate and Water

Provide fine and coarse aggregates and water that conform to materials permitted by ASTM C476.

2.5 MORTAR AND GROUT MIXES

2.5.1 Mortar Mix

a. Provide mortar that conforms to ASTM C270. Use Type M or S mortar.

b. For preblended mortar, follow manufacturer's mixing instructions.

2.5.2 Grout and Ready Mix Grout Mix

Use grout that conforms to ASTM C476, fine. Use conventional grout with a slump between 8 and 11 inches. Provide minimum grout strength of 2000 psi in 28 days, as tested in accordance with ASTM C1019. Do not change proportions and do not use materials with different physical or chemical characteristics in grout for the work unless additional evidence is furnished that grout meets the specified requirements. Use ready-mixed grout that conforms to ASTM C476.

2.6 ACCESSORIES

2.6.1 Grout Barriers

Grout barriers for vertical cores that consist of fine mesh wire, fiberglass, or expanded metal.

2.6.2 Anchors, Ties, and Bar Positioners

2.6.2.1 General

a. Fabricate anchors and ties without drips or crimps. Size anchors and ties to provide a minimum of 5/8 inch mortar cover from each face of masonry.

b. Fabricate steel wire anchors and ties shall from wire conforming to ASTM A1064/A1064M and hot-dip galvanize in accordance with ASTM A153/A153M.

c. Fabricate joint reinforcement in conformance with ASTM A951/A951M. Hot dip galvanize joint reinforcement in exterior walls in conformance with ASTM A153/A153M; coordinate with paragraph JOINT REINFORCEMENT below.

d. Fabricate sheet metal anchors and ties in conformance with ASTM A1008/A1008M. Hot dip galvanize sheet metal anchors and ties in exterior walls and in interior walls exposed to moist environment in compliance with ASTM A153/A153M Class B. Galvanize sheet metal anchors and ties in other interior walls in compliance with ASTM A653/A653M,
Coating Designation G60.

e. Submit two anchors, ties and bar positioners of each type used, as samples.

2.6.2.2 Wall Ties for Multi-Wythe Masonry Construction

Provide rectangular-shaped wall ties, fabricated of hot-dipped galvanized W1.7 diameter steel wire. Provide rectangular wall ties no less than 4 inches wide.

Provide adjustable type wall ties, if approved for use, that consist of two essentially U-shaped elements fabricated of minimum W2.8 diameter steel wire or pintle type ties that are inserted to eyes of horizontal joint reinforcement, hot-dip galvanized. Provide adjustable ties with double pintle legs and allows a maximum offset of 1-1/4 inch between each element of the tie and maximum distance between connecting parts no more than 1/16 inch. Form the pintle and eye elements shall be formed so that both can be in the same plane. Wall ties may also be of a continuous type conforming to paragraph JOINT REINFORCEMENT.

2.6.2.3 Dovetail Anchors

Provide dovetail anchors of 3/16 inch diameter steel wire, triangular shaped, and attached to a 12 gauge or heavier steel dovetail section. Use these anchors to connect the exterior masonry wythe as it passes over the face of concrete columns, beams, or walls. Fill cells immediately above and below these anchors unless solid units are used.

2.6.2.4 Adjustable Anchors

2.6.2.4.1 Anchorage of Veneer to Light Gauge Steel or Concrete Backing

Use one of the following types of adjustable anchors to connect veneer to light gauge steel or concrete backing:

a. sheet metal at least 7/8 inch wide, 0.06 inch thick, and with corrugations having a wavelength of 0.3 to 0.5 inch and an amplitude of 0.06 to 0.10 inch or bent, notched or punched to provide equivalent performance;

b. wire anchors of minimum size W1.7 with ends bent to form a minimum 2 inches extension and without drips;

c. or wire pintle anchors used in conjunction with joint reinforcement.

Do not exceed 1/16 inch clearance between connecting parts of the tie. Assemble adjustable anchors to prevent disengagement. Provide pintle anchors with one or more pintle legs of wire size W2.8 and an offset not exceeding 1-1/4 inch.

2.6.2.5 Veneer Anchor Screws

Provide screws for attachment of veneer anchors to cold-formed steel framing members of size as required by design to provide the needed pullout load capacity but not less than No. 12. Provide length of screws such that the screws penetrate the holding member by not less than 5/8 inch.
2.6.2.6 Bar Positioners

Factory-fabricate bar positioners, used to prevent displacement of reinforcing bars during the course of construction, from 9 gauge steel wire or equivalent, and hot-dip galvanized.

2.6.3 Joint Reinforcement

Factory fabricate joint reinforcement in conformance with ASTM A951/A951M, welded construction. Provide ladder type joint reinforcement, having one longitudinal wire in the mortar bed of each face shell for hollow units and one wire for solid units and with all wires a minimum of 9 gauge. Size joint reinforcement to provide a minimum of 5/8 inch cover from each face. Space crosswires not more than 16 inches. Provide joint reinforcement for straight runs in flat sections not less than 10 feet long. Provide joint reinforcement with factory formed corners and intersections. If approved for use, joint reinforcement may be furnished with adjustable wall tie features. Submit one piece of each type used, including corner and wall intersection pieces, showing at least two cross wires.

2.6.4 Reinforcing Steel Bars

Reinforcing steel bars and rods shall conform to ASTM A615/A615M or ASTM A996/A996M, Grade 60.

2.6.5 Concrete Masonry Control Joint Keys

Provide control joint keys of a factory fabricated solid section of natural or synthetic rubber (or combination thereof) conforming to ASTM D2000 M2AA-805 with a minimum durometer hardness of 80 or polyvinyl chloride conforming to ASTM D2287 Type PVC 654-4 with a minimum durometer hardness of 85. Form the control joint key with a solid shear section not less than 5/8 inch thick and 3/8 inch thick flanges, with a tolerance of plus or minus 1/16 inch, to fit neatly, but without forcing, in masonry unit jamb sash grooves.

2.6.6 Clay Masonry Expansion-Joint Materials

Provide backer rod and sealant, adequate to accommodate joint compression and extension equal to 50 percent of the width of the joint. Provide the backer rod of compressible rod stock of closed cell polyethylene foam, polyurethane foam, butyl rubber foam, or other flexible, nonabsorptive material as recommended by the sealant manufacturer. Provide sealant in conformance with Section 07 92 00 JOINT SEALANTS.

Submit one piece of each type of material used.

2.6.7 Through Wall Flashing and Weeps

2.6.7.1 General

Provide coated copper, copper or stainless steel sheet, self-adhesive rubberized sheet, or reinforced membrane sheet flashing except that the material shall be one which is not adversely affected by dampproofing material.
2.6.7.2 Coated-Copper Flashing

Provide 7 ounce, electrolytic copper sheet, uniformly coated on both sides with acidproof, alkali-proof, asphalt impregnated kraft paper or polyethylene sheets.

2.6.7.3 Copper or Stainless Steel Flashing

Provide copper sheet, complying with ASTM B370, minimum 16 ounce weight; or stainless steel, ASTM A167, Type 304 or 316, 0.015 inch thick, No. 2D finish.

2.6.7.4 Rubberized Flashing

Provide self-adhesive rubberized asphalt sheet flashing consisting of 32-mil thick pliable and highly adhesive rubberized asphalt compound bonded completely and integrally to 8-mil thick, high density, cross-laminated polyethylene film to produce an overall thickness of 40 mils. Provide rubberized, asphalt-based mastic and surface conditioner that are each approved by flashing manufacturer for use with flashing material.

2.6.7.5 Weep Ventilators

Provide weep ventilators that are prefabricated from stainless steel or plastic. Provide inserts with grill or louver-type openings designed to allow the passage of moisture from cavities and to prevent the entrance of insects, and with a rectangular closure strip to prevent mortar droppings from clogging the opening. Provide ventilators with compressible flanges to fit in a standard 3/8 inch wide mortar joint and with height equal to the nominal height of the unit.

2.6.7.6 Metal Drip Edge

Provide stainless steel drip edge, 15-mil thick, hemmed edges, with down-turned drip at the outside edge and upturned dam at the inside edge for use with membrane flashings.

2.6.8 RIGID BOARD-TYPE INSULATION

Provide rigid board-type insulation as specified in Section 07 21 13 BOARD AND BLOCK INSULATION.

PART 3 EXECUTION

3.1 EXAMINATION

Prior to start of work, verify the applicable conditions as set forth in TMS MSJC, inspection.

3.2 PREPARATION

3.2.1 Stains

Protect exposed surfaces from mortar and other stains. When mortar joints are tooled, remove mortar from exposed surfaces with fiber brushes and wooden paddles. Protect base of walls from splash stains by covering adjacent ground with sand, sawdust, or polyethylene.
3.2.2 Loads

Do not apply uniform loads for at least 12 hours or concentrated loads for at least 72 hours after masonry is constructed. Provide temporary bracing as required.

3.2.3 Concrete Surfaces

Where masonry is to be placed, clean concrete of laitance, dust, dirt, oil, organic matter, or other foreign materials and slightly roughen to provide a surface texture with a depth of at least 1/8 inch. Sandblast, if necessary, to remove laitance from pores and to expose the aggregate.

3.2.4 Shelf Angles

Adjust shelf angles as required to keep the masonry level and at the proper elevation.

3.2.5 Bracing

Provide bracing and scaffolding necessary for masonry work.

3.3 ERECTION

3.3.1 General

a. Coordinate masonry work with the work of other trades to accommodate built-in items and to avoid cutting and patching. Lay masonry units in running bond pattern. Lay facing courses level with back-up courses, unless the use of adjustable ties has been approved in which case the tolerances is plus or minus 1/2 inch. Adjust each unit to its final position while mortar is still soft and has plastic consistency.

b. Remove and clean units that have been disturbed after the mortar has stiffened, and relay with fresh mortar. Keep air spaces, cavities, chases, expansion joints, and spaces to be grouted free from mortar and other debris. Select units to be used in exposed masonry surfaces from those having the least amount of chipped edges or other imperfections detracting from the appearance of the finished work.

c. When necessary to temporarily discontinue the work, step (rack) back the masonry for joining when work resumes. Toothing may be used only when specifically approved by the Contracting Officer. Before resuming work, remove loose mortar and thoroughly clean the exposed joint. Cover the top of walls subjected to rain or snow with nonstaining waterproof covering or membrane when work is not in process. Extend the covering a minimum of 610 mm 2 feet down on each side of the wall and hold securely in place.

d. Ensure that units being laid and surfaces to receive units are free of water film and frost. Lay solid units in a nonfurrowed full bed of mortar. Bevel mortar for veneer wythes and slope down toward the cavity side. Shove units into place so that the vertical joints are tight. Completely fill vertical joints between solid units with mortar, except where indicated at control, expansion, and isolation joints. Place hollow units so that mortar extends to the depth of the face shell at heads and beds, unless otherwise indicated. Mortar will be permitted to protrude up to 1/2 inch into the space or cells to be grouted. Provide means to prevent mortar from dropping into the space.
below or clean grout spaces prior to grouting.

e. In multi-wythe construction with collar joints no more than 3/4 inch wide, bring up the inner wythe not more than 16 inches ahead of the outer wythe. Fill collar joints with mortar during the laying of the facing wythe, and filling shall not lag the laying of the facing wythe by back-buttering each unit as it is laid.

3.3.1 Jointing

Tool mortar joints when the mortar is thumbprint hard. Tool horizontal joints after tooling vertical joints. Brush mortar joints to remove loose and excess mortar.

3.3.1.1 Tooled Joints

Tool mortar joints in exposed exterior and interior masonry surfaces concave, using a jointer that is slightly larger than the joint width so that complete contact is made along the edges of the unit. Perform tooling so that the mortar is compressed and the joint surface is sealed. Use a jointer of sufficient length to obtain a straight and true mortar joint.

3.3.1.2 Flush Joints

Flush cut mortar joints in concealed masonry surfaces and joints at electrical outlet boxes in wet areas. Finish flush cut joints by cutting off the mortar flush with the face of the wall. Point joints in unparged masonry walls below grade tight. For architectural units, such as fluted units, completely fill both the head and bed joints and flush cut.

3.3.1.3 Door and Window Frame Joints

On the exposed interior side of exterior frames, joints between frames and abutting masonry walls shall be raked to a depth of 3/8 inch. On the exterior side of exterior frames, joints between frames and abutting masonry walls shall be raked to a depth of 3/8 inch.

3.3.1.4 Joint Widths

a. Construct brick masonry with mortar joint widths equal to the difference between the specified and nominal dimensions of the unit, within tolerances permitted by TMS MSJC.

b. Provide 3/8 inch wide mortar joints in concrete masonry, except for prefaced concrete masonry units.

c. Provide 3/8 inch wide mortar joints on unfaced side of prefaced concrete masonry units and not less than 3/16 inch nor more than 1/4 inch wide on prefaced side.

d. Maintain mortar joint widths within tolerances permitted by TMS MSJC

3.3.2 Cutting and Fitting

Use full units of the proper size wherever possible, in lieu of cut units. Locate cut units where they would have the least impact on the architectural aesthetic goals of the facility. Perform cutting and fitting, including that required to accommodate the work of others, by masonry mechanics using power masonry saws. Concrete masonry units may be
wet or dry cut. Before being placed in the work, dry wet-cut units to the same surface-dry appearance as uncut units being laid in the wall. Provide cut edges that are clean, true and sharp.

a. Carefully make openings in the masonry so that wall plates, cover plates or escutcheons required by the installation will completely conceal the openings and will have bottoms parallel with the masonry bed joints. Provide reinforced masonry lintels above openings over 12 inches wide for pipes, ducts, cable trays, and other wall penetrations, unless steel sleeves are used.

b. Do not reduce masonry units in size by more than one-third in height and one-half in length. Do not locate cut products at ends of walls, corners, and other openings.

3.3.1.3 Unfinished Work

Rack back unfinished work for joining with new work. Toothing may be resorted to only when specifically approved by the Contracting Officer. Remove loose mortar and thoroughly clean the exposed joints before laying new work.

3.3.1.4 Clay Masonry Expansion Joints

Provide clay masonry expansion joints as indicated. Ensure that no mortar or other noncompressible materials are within the joint. Install backer rod and sealant in accordance with Section 07 92 00 JOINT SEALANTS.

3.3.1.5 Control Joints

Provide control joints in concrete masonry as indicated. Construct as indicted on the drawings.

3.3.2 Clay or Shale Brick Masonry

3.3.2.1 Brick Placement

Blend all brick at the jobsite from several cubes to produce a uniform appearance when installed. An observable "banding" or "layering" of colors or textures caused by improperly mixed brick is unacceptable. Lay brick facing with the better face exposed. Lay brick in running bond with each course bonded at corners, unless otherwise indicated. Lay molded brick with the frog side down. Do not lay brick that is cored, recessed, or has other deformations in a manner that allows those deformations to be exposed to view; lay 100 percent solid units in these areas. Completely fill head and bed joints of solid units with mortar. Lay hollow units with mortar joints as specified for concrete masonry units.

Place exterior face of salvaged bricks towards the exterior.

3.3.2.2 Wetting of Units

Wetting of clay, shale brick, or hollow brick units having an initial rate of absorption of more than 1 gram per minute per square inch of bed surface shall be in conformance with ASTM C67. Ensure that each unit is nearly saturated when wetted but surface dry when laid.
Test clay or shale brick daily on the job, prior to laying, as follows: Using a wax pencil, draw a circle the size of a quarter on five randomly selected bricks. Apply 20 drops of water with a medicine dropper to the surface within the circle on each brick. If the average time that the water is completely absorbed in the five bricks is less than 1-1/2 minutes, wet bricks represented by the five bricks tested.

3.3.2.3 Brick Sills

Lay brick on edge, slope not less than 3/4 inch downward to the outside, and project not less than 1/2 inch beyond the face of the wall to form a wash and drip. Fill all joints solidly with mortar and tool.

3.3.3 Anchored Veneer Construction

a. Construct exterior masonry wythes to the thickness indicated on the drawings. Provide a air space behind the masonry veneer as indicated on the drawings. Provide means to ensure that the cavity space and flashings are kept clean of mortar droppings and other loose debris. Maintain chases and raked-out joints free from mortar and debris.

b. Place masonry in each specified type of bond pattern indicated on the drawings. Place longitudinal reinforcement, consisting of at least one continuous hot-dip galvanized W 1.7 (9gauge) steel wire, in the veneer wythe when laid in stack bond.

c. For veneer over stud framing, do not install veneer until the exterior sheathing, moisture barrier, veneer anchors and flashing have been installed on the backing. Take extreme care to avoid damage to the moisture barrier and flashing during construction of the masonry veneer. Repair or replace portions of the moisture barrier and flashing that are damaged prior to completion of the veneer. Provide a continuous cavity as indicated.

d. For veneer with a masonry backup wythe, lay up both the inner and the outer wythes together except when adjustable joint reinforcement assemblies are approved for use. When both wythes are not brought up together, install through-wall flashings with the exterior wythe, securing the top edge of the flashing with a termination bar and sealant, or protect flashings that are installed with the interior wythe from damage until they are fully enclosed in the wall.

e. Provide anchors (ties) to connect the veneer to its backing in sufficient quantity to comply with the following requirements: maximum vertical spacing of 32 inches, and maximum horizontal spacing of 32 inches. Provide additional anchors around openings larger than 16 inch in either direction. Space anchors around perimeter of opening at a maximum of 32 inches on center. Place anchors within 12 inches of openings. Anchors with drips are not permitted.

f. With solid units, embed anchors in mortar joint and extend into the veneer a minimum of 1-1/2 inch, with at least 5/8 inch mortar cover to the outside face.

g. With hollow units, embed anchors in mortar or grout and extend into the veneer a minimum of 1-1/2 inch, with at least 5/8 inch mortar or grout cover to outside face.
3.3.4 Composite Walls

Tie masonry wythes together with joint reinforcement or with unit wall ties. Embed wall ties at least 1-1/2 inch into mortar of solid units and at least 1/2 inch into the mortar of the outer face shell of hollow units. Provide at least one tie every 2.67 square feet for wire size W1.7 and at least one tie every 4.50 square feet for wire size W2.8. Space ties at a maximum of 36 inches horizontally and 24 inches vertically. Do not cross expansion joints or control joints with ties. Fill collar joints between masonry facing and masonry backup solidly with grout.

3.3.5 Reinforced, Single Wythe Concrete Masonry Units Walls

3.3.5.1 Concrete Masonry Unit Placement

a. Fully bed units used to form piers, pilasters, columns, starting courses on footings, solid foundation walls, lintels, and beams, and where cells are to be filled with grout in mortar under both face shells and webs. Provide mortar beds under both face shells for other units. Mortar head joints for a distance in from the face of the unit not less than the thickness of the face shell.

b. Solidly grout foundation walls below grade.

d. Submit drawings showing elevations of walls exposed to view and indicating the location of all cut CMU products.

3.3.5.2 Preparation for Reinforcement

Lay units in such a manner as to preserve the unobstructed vertical continuity of cores to be grouted. Remove mortar protrusions extending 1/2 inch or more into cells before placing grout. Position reinforcing bars accurately as indicated before placing grout. Where vertical reinforcement occurs, fill cores solid with grout in accordance with paragraph PLACING GROUT in this Section.

3.3.6 ANCHORAGE

3.3.6.1 Anchorage to Concrete

Anchorage of masonry to the face of concrete columns, beams, or walls shall be with dovetail anchors spaced not over 16 inches on centers vertically and 24 inches on center horizontally.

3.3.6.2 Anchorage to Structural Steel

Masonry shall be anchored to vertical structural steel framing with adjustable steel wire anchors spaced not over 16 inches on centers vertically, and if applicable, not over 24 inches on centers horizontally.

3.3.7 Lintels

3.3.8 Sills and Copings

Set sills and copings in a full bed of mortar with faces plumb and true. Slope sills and copings to drain water. Mechanically anchor copings and sills longer than 4 feet as indicated.
3.4 INSTALLATION

3.4.1 Bar Reinforcement Installation

3.4.1.1 Preparation

Submit detail drawings showing bar splice locations. Identify bent bars on a bending diagram and reference and locate such bars on the drawings. Show wall dimensions, bar clearances, and wall openings. Utilize bending details that conform to the requirements of ACI SP-66. No approval will be given to the shop drawings until the Contractor certifies that all openings, including those for mechanical and electrical service, are shown. If, during construction, additional masonry openings are required, resubmit the approved shop drawings with the additional openings shown along with the proposed changes. Clearly highlight location of these additional openings. Provide wall elevation drawings with minimum scale of 1/4 inch per foot. Submit drawings including plans, elevations, and details of wall reinforcement; details of reinforcing bars at corners and wall intersections; offsets; tops, bottoms, and ends of walls; control and expansion joints; lintels; and wall openings.

Clean reinforcement of loose, flaky rust, scale, grease, mortar, grout, and other coatings that might destroy or reduce its bond prior to placing grout. Do not use bars with kinks or bends not shown on the approved shop drawings. Place reinforcement prior to grouting. Unless otherwise indicated, extend vertical wall reinforcement to within 2 inches of tops of walls.

3.4.1.2 Positioning Bars

a. Accurately place vertical bars within the cells at the positions indicated on the drawings. A minimum clearance of 1/2 inch shall be maintained between the bars and masonry units. Provide minimum clearance between parallel bars of 1/2 inch between the bars and masonry units for coarse grout and a minimum clearance of 1/4 inch between the bars and masonry units for fine grout. Provide minimum clearance between parallel bars of 1 inch or one diameter of the reinforcement, whichever is greater. Vertical reinforcement may be held in place using bar positioners located near the ends of each bar and at intermediate intervals of not more than 192 diameters of the reinforcement or by other means to prevent displacement beyond permitted tolerances. As masonry work progresses, secure vertical reinforcement to prevent displacement beyond allowable tolerances.

c. Position horizontal reinforcing bars as indicated. Stagger splices in adjacent horizontal bars, unless otherwise indicated.

d. Form splices by lapping bars as indicated. Do not cut, bend or eliminate reinforcing bars. Foundation dowel bars may be field-bent when permitted by TMS MSJC.

3.4.1.3 Splices of Bar Reinforcement

Lap splice reinforcing bars as indicated. When used, provide welded or mechanical connections that develop at least 125 percent of the specified yield strength of the reinforcement.
3.4.2 Placing Grout

3.4.2.1 General

Fill cells containing reinforcing bars with grout. Solidly grout hollow masonry units in walls or partitions supporting plumbing, heating, or other mechanical fixtures, voids at door and window jambs, and other indicated spaces. Solidly grout cells under lintel bearings on each side of openings for full height of openings. Solidly grout walls below grade, lintels, and bond beams. Units other than open end units may require grouting each course to preclude voids in the units.

Discard site-mixed grout that is not placed within 1-1/2 hours after water is first added to the batch or when the specified slump is not met without adding water after initial mixing. Discard ready-mixed grout that does not meet the specified slump without adding water other than water that was added at the time of initial discharge. Allow sufficient time between grout lifts to preclude displacement or cracking of face shells of masonry units. Provide a grout shear key between lifts when grouting is delayed and the lower lift loses plasticity. If blowouts, flowouts, misalignment, or cracking of face shells should occur during construction, tear down the wall and rebuild.

3.4.2.2 Vertical Grout Barriers for Multi-Wythe Composite Walls

In multi-wythe composite walls, provide grout barriers in the collar join not more than 30 feet apart, or as required, to limit the horizontal flow of grout for each pour.

3.4.2.3 Horizontal Grout Barriers

Embed horizontal grout barriers in mortar below cells of hollow units receiving grout.

3.4.2.4 Grout Holes and Cleanouts

3.4.2.4.1 Grout Holes

Provide grouting holes in slabs, spandrel beams, and other in-place overhead construction. Locate holes over vertical reinforcing bars or as required to facilitate grout fill in bond beams. Provide additional openings spaced not more than 16 inches on centers where grouting of hollow unit masonry is indicated. Form such openings not less than 4 inches in diameter or 3 by 4 inches in horizontal dimensions. Upon completion of grouting operations, plug and finish grouting holes to match surrounding surfaces.

3.4.2.4.2 Cleanouts for Hollow Unit Masonry Construction

For hollow masonry units, provide cleanout holes at the bottom of every grout pour in cores containing vertical reinforcement when the height of the grout pour exceeds 5 feet 4 inches. Where all cells are to be grouted, construct cleanout courses using bond beam units in an inverted position to permit cleaning of all cells. Provide cleanout holes at a maximum spacing of 32 inches where all cells are to be filled with grout.

Establish a new series of cleanouts if grouting operations are stopped for more than 4 hours. Provide cleanouts not less than 3 by 3 inch by cutting
openings in one face shell. Manufacturer’s standard cutout units may be used at the Contractor’s option. Do not cleanout holes until masonry work, reinforcement, and final cleaning of the grout spaces have been completed and inspected. For walls which will be exposed to view, close cleanout holes in an approved manner to match surrounding masonry.

3.4.2.4.3 Cleanouts for Multi-Wythe Composite Masonry Construction

Provide cleanouts for construction of walls that incorporate a grout filled cavity between solid masonry wythes, provide cleanouts at the bottom of every pour by omitting every other masonry unit from one wythe. Establish a new series of cleanouts if grouting operations are stopped for more than 4 hours. Do not plug cleanout holes until masonry work, reinforcement, and final cleaning of the grout spaces have been completed and inspected. For walls which will be exposed to view, close cleanout holes in an approved manner to match surrounding masonry.

3.4.2.5 Grout Placement

A grout pour is the total height of masonry to be grouted prior to erection of additional masonry. A grout lift is an increment of grout placement within a grout pour. A grout pour is filled by one or more lifts of grout.

a. Lay masonry to the top of a pour permitted by TMS MSJC Table 7, based on the size of the grout space and the type of grout. Prior to grouting, remove masonry protrusions that extend 1/2 inch or more into cells or spaces to be grouted. Provide grout holes and cleanouts in accordance with paragraph GROUT HOLES AND CLEANOUTS above when the grout pour height exceeds 5 feet 4 inches. Hold reinforcement, bolts, and embedded connections rigidly in position before grouting is started. Do not prewet concrete masonry units.

b. Place grout using a hand bucket, concrete hopper, or grout pump to fill the grout space without segregation of aggregate. Operate grout pumps to produce a continuous stream of grout without air pockets, segregation, or contamination.

c. If the masonry has cured at least 4 hours, grout slump is maintained between 10 to 11 inches, and no intermediate reinforced bond beams are placed between the top and bottom of the pour height, place conventional grout in lifts not exceeding 12 feet 8 inches. For the same curing and slump conditions but with intermediate bond beams, limit conventional grout lift to the bottom of the lowest bond beam that is more than 5 feet 4 inches above the bottom of the lift, but do not exceed 12 feet 8 inches. If masonry has not cured at least 4 hours or grout slump is not maintained between 10 to 11 inches, place conventional grout in lifts not exceeding 5 feet 4 inches.

d. Consolidate conventional grout lift and reconsolidate after initial settlement before placing next lift. For grout pours that are 12 inches or less in height, consolidate and reconsolidate grout by mechanical vibration or puddling. For grout pours that are greater than 12 inches in height, consolidate and reconsolidate grout by mechanical vibration. Apply vibrators at uniformly spaced points not further apart than the visible effectiveness of the machine. Limit duration of vibration to time necessary to produce satisfactory consolidation without causing segregation. If previous lift is not permitted to set, dip vibrator into previous lift. Do not insert vibrators into lower lifts that are in a semi-solidified state. If lower lift sets prior to
placement of subsequent lift, form a grout key by terminating grout a
minimum of 1-1/2 inch below a mortar joint. Vibrate each vertical cell
containing reinforcement in partially grouted masonry. Do not form
gROUT keys within beams.

e. If the masonry has cured 4 hours, place self-consolidating grout (SCG)
in lifts not exceeding the pour height. If masonry has not cured for
at least 4 hours, place SCG in lifts not exceeding 5 feet 4 inches. Do
not mechanically consolidate self-consolidating grout. Place
self-consolidating grout in accordance with manufacturer's
recommendations.

f. Upon completion of each day's grouting, remove waste materials and
debris from the equipment, and dispose of outside the masonry.

3.4.3 Joint Reinforcement Installation

Install joint reinforcement at 16 inches on center unless otherwise
indicated. Lap joint reinforcement not less than 8 inches. Install
prefabricated sections at corners and wall intersections. Place the
longitudinal wires of joint reinforcement in mortar beds to provide not
less than 5/8 inch cover to either face of the unit.

3.4.4 Flashing and Weeps

Install through-wall flashing at obstructions in the cavity and where
indicated on Drawings. Ensure continuity of the flashing at laps and
inside and outside corners by splicing in a manner approved by the flashing
manufacturer. Ensure that the top edge of the flashing is sealed by
turning the flashing 1/2 inch into the mortar bed joint of backup masonry.
Terminate the horizontal leg of the flashing by extending the sheet metal
1/2 inch beyond the outside face of masonry and turning downward with a
hemmed drip terminating the fabric flashing 1/2 inch short of the outside
face of masonry and adhering the flashing to a sheet metal drip edge.
Provide sealant below the drip edge of through-wall flashing.

Wherever through-wall flashing occurs, provide weep holes to drain flashing
to exterior at acceptable locations as indicated. Provide weeps of weep
ventilators. Locate weeps not more than 24 inches on centers in mortar
joints of the exterior wythe directly on the horizontal leg of through-wall
flashing over foundations, bond beams, and any other horizontal
interruptions of the cavity. Place weep holes perfectly horizontal or
slightly canted downward to encourage water drainage outward and not
inward. Other methods may be used for providing weeps when spacing is
reduced to 16 inches on center and approved by the Contracting Officer.
Maintain weeps free of mortar and other obstructions.

3.5 APPLICATION

3.5.1 Insulation

Insulate cavity walls (multi-wythe noncomposite masonry walls), where
shown, by installing board-type insulation on the cavity side of the inner
wythe. Apply board type insulation directly to the masonry or thru-wall
flashing with adhesive. Neatly fit insulation between obstructions without
impaling insulation on ties or anchors. Apply insulation in parallel
courses with vertical joints breaking midway over the course below and in
moderate contact with adjoining units without forcing. Cut to fit neatly
against adjoining surfaces. Tape or seal the joints between the boards.
3.5.2 Interface with Other Products

3.5.2.1 Built-In Items

Fill spaces around built-in items with mortar. Point openings around flush-mount electrical outlet boxes in wet locations with mortar. Embed anchors, ties, wall plugs, accessories, flashing, pipe sleeves and other items required to be built-in as the masonry work progresses. Fully embed anchors, ties and joint reinforcement in the mortar. Fill cells receiving anchor bolts and cells of the first course below bearing plates with grout, unless otherwise indicated.

3.5.2.2 Door and Window Frame Joints

On the exposed interior and exterior sides of exterior frames, rake joints between frames and abutting masonry walls to a depth of 3/8 inch.

3.5.3 Tolerances

Lay masonry plumb, true to line, with courses level within the tolerances of TMS MSJC, Article 3.3 F.

3.6 FIELD QUALITY CONTROL

3.6.1 Tests

3.6.1.1 Field Testing of Mortar

Perform mortar testing at the following frequency: 1 time per 5000 square feet. For each required mortar test, provide a minimum of three mortar samples. Perform initial mortar testing prior to construction for comparison purposes during construction.

Prepare and test mortar samples for mortar aggregate ratio in accordance with ASTM C780 Appendix A4.

3.6.1.2 Field Testing of Grout

a. Perform grout testing at the following frequency: 1 time per 5000 square feet. For each required grout property to be evaluated, provide a minimum of three specimens.

b. Sample and test conventional and self-consolidating grout for compressive strength and temperature in accordance with ASTM C1019.

c. Evaluate slump in conventional grout in accordance with ASTM C1019.

d. Evaluate slump flow and visual stability index of self-consolidating grout in accordance with ASTM C1611/C1611M.

3.6.1.3 Prism Tests

Perform at least one prism test sample for each 5,000 square feet of wall but not less than three such tests for any building. Evaluate three prisms in each test. Fabricate, store, handle, and test prisms in accordance with ASTM C1314.

Seven-day tests may be used provided the relationship between the 7- and
28-day strengths of the masonry is established by the tests of the materials used. If the compressive strength of any prism falls below the specified value by more than 500 psi, take steps to assure that the load-carrying capacity of the structure is not jeopardized. If the likelihood of low-strength masonry is confirmed and computations indicate that the load-carrying capacity may have been significantly reduced, tests of cores drilled, or prisms sawed, from the area in question may be required. In such case, take three specimens for each prism test more than 500 psi below the specified value. Masonry in the area in question will be considered structurally adequate if the average compressive strength of three specimens is equal to or exceeds the specified value. Additional testing of specimens extracted from locations represented by erratic core or prism strength test results will be permitted.

3.6.1.4 Single-Wythe Masonry Wall Water Penetration Test

Prior to the start of field construction of the single-wythe concrete masonry wall, perform masonry wall water penetration test on mock-up wall assemblies consisting of the identical design, materials, mix, and construction methods as the actual wall construction and in accordance with ASTM E514/E514M. Prepare a minimum of three specimens and cure for minimum 28 days prior to testing. Construct panels by the same methods, processes, and applications to be used on the project’s construction site. Spray test for 6 hours on each specimen. If water is visible on back of test panels during the test and areas of dampness on the backside of the test panels do not exceed 25 percent of the wall area, the panels will be considered to have passed. Dampness is defined as any area of surface darkening or discoloration due to moisture penetration or accumulation below the observed surface.

Construct additional test panels for each failed test performed until three test panels pass the test. Factors that can affect test performance include materials, mixing, and quality of application and workmanship. Materials, mixing, and methods adjustments may be necessary in order to provide construction that passes the water penetration test. Document and record the test specimen construction materials and application and provide written test report in accordance with ASTM E514/E514M, supplemented by a detailed discussion of the specifics of test panel construction, application methods and processes used, quality of construction, and any variances or deviations that may have occurred between test panels during test panel construction. For failed test panels, identify in the supplemental report the variances, deficiencies or flaws that contributed to test panel failure and itemize the precautions to be taken in field construction of the masonry wall to prevent similar deficiencies and assure the wall construction replicates test panel conditions that pass the water penetration test. Submit the complete, certified test report, including supplemental report, to the Contracting Officer prior to the start of single-wythe concrete masonry wall construction. Significant changes to materials, proportions, or construction techniques from those used in the passing water penetration test are grounds for performing new tests, at the discretion of the Contracting Officer.

3.7 POINTING AND CLEANING

After mortar joints have attained their initial set, but prior to hardening, completely remove mortar and grout daubs and splashings from masonry-unit surfaces that will be exposed or painted. Before completion of the work, rake out defects in joints of masonry to be exposed or painted, fill with mortar, and tool to match existing joints. Immediately
after grout work is completed, remove scum and stains that have percolated through the masonry work using a low pressure stream of water and a stiff bristled brush. Do not clean masonry surfaces, other than removing excess surface mortar, until mortar in joints has hardened. Leave masonry surfaces clean, free of mortar daubs, dirt, stain, and discoloration, including scum from cleaning operations, and with tight mortar joints throughout. Do not use metal tools and metal brushes for cleaning.

3.7.1 Dry-Brushing Concrete Masonry

Dry brush exposed concrete masonry surfaces at the end of each day's work and after any required pointing, using stiff-fiber bristled brushes.

3.7.2 Clay Brick Surfaces

Clean exposed clay brick masonry surfaces to obtain surfaces free of stain, dirt, mortar and grout daubs, efflorescence, and discoloration or scum from cleaning operations. Perform cleaning in accordance with the approved cleaning procedure demonstrated on the mockup.

After cleaning, examine the sample panel of similar material for discolouration or stain as a result of cleaning. If the sample panel is discolored or stained, change the method of cleaning to ensure that the masonry surfaces in the structure will not be adversely affected. Water-soak exposed masonry surfaces and then clean with a proprietary masonry cleaning agent specifically recommended for the color and texture by the clay brick manufacturer and manufacturer of the cleaning product. Apply the solution with stiff fiber brushes, followed immediately by thorough rinsing with clean water. Use proprietary cleaning agents in conformance with the cleaning product manufacturer's printed recommendations. Remove efflorescence in conformance with the brick manufacturer's recommendations.

3.8 CLOSE-OUT TAKE-BACK PROGRAM

Collect information from manufacturer for take-back program options. Set aside masonry units, full and partial scrap packaging to be returned to manufacturer for recycling into new product. When such a service is not available, seek local recyclers to reclaim the materials. Submit documentation that includes contact information, summary of procedures, and the limitations and conditions applicable to the project. Indicate manufacturer's commitment to reclaim materials for recycling and/or reuse.

3.9 PROTECTION

Protect facing materials against staining. Cover top of walls with nonstaining waterproof covering or membrane to protect from moisture intrusion when work is not in progress. Continue covering the top of the unfinished walls until the wall is waterproofed with a complete roof or parapet system. Extend covering a minimum of 2 feet down on each side of the wall and hold securely in place. Before starting or resuming work, clean top surface of masonry in place of loose mortar and foreign material.

-- End of Section --
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 INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 360 (2016) Specification for Structural Steel Buildings

AMERICAN SOCIETY FOR NONDESTRUCTIVE TESTING (ASNT)


AMERICAN WELDING SOCIETY (AWS)


AWS D1.1/D1.1M (2015; Errata 1 2015; Errata 2 2016) Structural Welding Code - Steel


AWS D1.4/D1.4M (2011) Structural Welding Code - Reinforcing Steel


ASTM INTERNATIONAL (ASTM)


1.2  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. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in
accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Welding Quality Assurance Plan

SD-03 Product Data

Welding Procedure Qualifications; G
Welder, Welding Operator, and Tacker Qualification
Inspector Qualification
Previous Qualifications
Pre-Qualified Procedures
Welding Electrodes and Rods

SD-06 Test Reports

Nondestructive Testing

1.3 QUALITY ASSURANCE

Except for pre-qualified (in accordance with AWS D1.1/D1.1M) and previously qualified procedures, each Contractor performing welding must record in detail and qualify the welding procedure specification for any welding procedure followed in the fabrication of weldments. Conform welding procedure qualifications to AWS D1.1/D1.1M and to the specifications in this section. Submit for approval copies of the welding procedure specification and the results of the procedure qualification test records for each type of welding which requires procedure qualification and the welder, welding operator, or tacker qualification test records. Approval of any procedure, however, does not relieve the Contractor of the sole responsibility for producing a finished structure meeting all the specified requirements. Submit this information on the forms in Annex M of AWS D1.1/D1.1M. Individually identify and clearly reference on the detail drawings and erection drawings all welding procedure specifications, or suitably key them to the contract drawings. In case of conflict between this specification and AWS D1.1/D1.1M, this specification governs.

1.3.1 General Requirements

Fabricate work in an AISC Certified Fabrication Plant, Category Std. Work must be erected by an AISC Certified Erector, Category ASCE.

a. For Structural Projects, provide documentation of the following:

(1) Component Thickness 1/8 inch and greater: Qualification documents (WPS, PQR, and WPQ) in accordance with AWS D1.1/D1.1M.

(2) Component Thickness Less than 1/8 inch: Qualification documents (WPS, PQR, and WPQ) in accordance with AWS D1.3/D1.3M.

(3) Reinforcing Steel: Qualification documents (WPS, PWR, and WPQ) in accordance with AWS D1.4/D1.4M.

1.3.2 Previous Qualifications

Welding procedures previously qualified by test may be accepted for this contract without re-qualification, upon receipt of the test results, if the following conditions are met:
a. Testing was performed by an approved testing laboratory, technical consultant, or the Contractor's approved quality control organization.

b. The qualified welding procedure conforms to the requirements of this specification and is applicable to welding conditions encountered under this contract.

c. The welder, welding operator, and tacker qualification tests conform to the requirements of this specification and are applicable to welding conditions encountered under this contract.

1.3.3 Pre-qualified Procedures

Welding procedures which are considered pre-qualified as specified in AWS D1.1/D1.1M will be accepted without further qualification. Submit for approval a listing or an annotated drawing to indicate the joints not pre-qualified. Procedure qualification is mandatory for these joints.

1.3.4 Retests

If welding procedure fails to meet the requirements of AWS D1.1/D1.1M, revise and re-qualify the procedure specification, or at the Contractor's option, welding procedure may be retested in accordance with AWS D1.1/D1.1M. If the welding procedure is qualified through retesting, submit all test results, including those of test welds that failed to meet the requirements, with the welding procedure.

1.3.5 Welder, Welding Operator, and Tacker Qualification

Each welder, welding operator, and tacker assigned to work on this contract must be qualified in accordance with the applicable requirements of AWS D1.1/D1.1M and as specified in this section. Welders, welding operators, and tackers who make acceptable procedure qualification test welds will be considered qualified for the welding procedure used.

1.3.5.1 Previous Personnel Qualifications

At the discretion of the Contracting Officer, welders, welding operators, and tackers qualified by test within the previous 6 months may be accepted for this contract without re-qualification if all the following conditions are met:

a. Copies of the welding procedure specifications, the procedure qualification test records, and the welder, welding operator, and tacker qualification test records are submitted and approved in accordance with the specified requirements for detail drawings.

b. Testing was performed by an approved testing laboratory, technical consultant, or the Contractor's approved quality control organization.

c. The previously qualified welding procedure conforms to the requirements of this specification and is applicable to welding conditions encountered under this contract.

d. The welder, welding operator, and tacker qualification tests conform to the requirements of this specification and are applicable to welding conditions encountered under this contract.
1.3.5.2 Certificates

Before assigning any welder, welding operator, or tacker to work under this contract, submit the names of the welders, welding operators, and tackers to be employed, and certification that each individual is qualified as specified. State in the certification the type of welding and positions for which the welder, welding operator, or tacker is qualified, the code and procedure under which the individual is qualified, the date qualified, and the name of the firm and person certifying the qualification tests. Keep the certification current, on file, and furnish 3 copies.

1.3.5.3 Renewal of Qualification

Re-qualification of a welder or welding operator is required under any of the following conditions:

a. It has been more than 6 months since the welder or welding operator has used the specific welding process for which he is qualified.

b. There is specific reason to question the welder or welding operator's ability to make welds that meet the requirements of these specifications.

c. The welder or welding operator was qualified by an employer other than those firms performing work under this contract, and a qualification test has not been taken within the past 12 months. Submit as evidence of conformance all records showing periods of employment, name of employer where welder, or welding operator, was last employed, and the process for which qualified.

d. A tacker who passes the qualification test is considered eligible to perform tack welding indefinitely in the positions and with the processes for which he/she is qualified, unless there is some specific reason to question the tacker's ability. In such a case, the tacker is required to pass the prescribed tack welding test.

1.3.6 Inspector Qualification

Submit inspector qualifications that are in accordance with AWS D1.1/D1.1M. Qualify all nondestructive testing personnel in accordance with the requirements of ANSI/ASNT CP-189 for Levels I or II in the applicable nondestructive testing method. The inspector may be supported by assistant welding inspectors who are not qualified to AWS D1.1/D1.1M, and assistant inspectors may perform specific inspection functions under the supervision of the qualified inspector, as allowed by AWS D1.1/D1.1M.

1.3.7 Symbols and Safety

Use symbols in accordance with AWS A2.4, unless otherwise indicated. Follow safe welding practices and safety precautions during welding in conformance with AWS Z49.1.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

Conform the design of welded connections to AISC 360, unless otherwise indicated or specified. Material with welds will not be accepted unless the welding is specified or indicated on the drawings or otherwise.
approved. Perform welding as specified in this section, except where additional requirements are shown on the drawings or are specified in other sections. Do not commence welding until welding procedures, inspectors, nondestructive testing personnel, welders, welding operators, and tackers have been qualified and the submittals approved by the Contracting Officer. Perform all testing at or near the work site. Maintain records of the test results obtained in welding procedure, welder, welding operator, and tacker performance qualifications.

2.1.1 Pre-erection Conference

Hold a pre-erection conference prior to the start of the field welding, to bring all affected parties together and to gain a naturally clear understanding of the project and the Welding Procedure Specifications (WPS) (submitted for all welding, including welding done using pre-qualified procedures). Mandatory attendance is required by all Contractor's welding production and inspection personnel and appropriate Government personnel. Include as items for discussion: responsibilities of various parties; welding procedures and processes to be followed; welding sequence (both within a joint and joint sequence within the building); inspection requirements and procedures, both visual and nondestructive testing; welding schedule; and other items deemed necessary by the attendees.

2.2 WELDING EQUIPMENT AND MATERIALS

Provide all welding equipment, welding electrodes and rods, welding wire, and fluxes capable of producing satisfactory welds when used by a qualified welder or welding operator performing qualified welding procedures. Use 70ksi welding electrodes. Provide welding equipment and materials that comply with the applicable requirements of AWS D1.1/D1.1M. Submit product data on welding electrodes and rods.

PART 3 EXECUTION

3.1 WELDING OPERATIONS

3.1.1 Requirements

Conform workmanship and techniques for welded construction to the requirements of AWS D1.1/D1.1M and AISC 360. When AWS D1.1/D1.1M and the AISC 360 specification conflict, the requirements of AWS D1.1/D1.1M govern.

3.1.2 Identification

Identify all welds in one of the following ways:

a. Submit written records to indicate the location of welds made by each welder, welding operator, or tacker.

b. Identify all work performed by each welder, welding operator, or tacker with an assigned number, letter, or symbol to identify welds made by that individual. The Contracting Officer may require welders, welding operators, and tackers to apply their symbol next to the weld by means of rubber stamp, felt-tipped marker with waterproof ink, or other methods that do not cause an indentation in the metal. Place the identification mark for seam welds adjacent to the weld at 3 foot intervals. Identification with die stamps or electric etchers is not allowed.
3.2 QUALITY CONTROL

Perform testing using an approved inspection or testing laboratory or technical consultant; or if approved, the Contractor's inspection and testing personnel may be used instead of the commercial inspection or testing laboratory or technical consultant. Perform visual inspections to determine conformance with paragraph STANDARDS OF ACCEPTANCE. Conform procedures and techniques for inspection with applicable requirements of AWS D1.1/D1.1M, ASTM E165/E165M, and ASTM E709. Submit a Welding Quality Assurance Plan and records of tests and inspections.

3.3 STANDARDS OF ACCEPTANCE

Conform dimensional tolerances for welded construction, details of welds, and quality of welds with the applicable requirements of AWS D1.1/D1.1M and the contract drawings. Perform nondestructive testing by visual inspection methods. The minimum extent of nondestructive testing must be random 25% percent of welds or joints, as indicated on the drawings. Submit all records of nondestructive testing.

3.3.1 Nondestructive Testing

The welding is subject to inspection and tests in the mill, shop, and field. Inspection and tests in the mill or shop do not relieve the Contractor of the responsibility to furnish weldments of satisfactory quality. When materials or workmanship do not conform to the specification requirements, the Government reserves the right to reject material or workmanship or both at any time before final acceptance of the structure containing the weldment. Any indication of a defect is regarded as a defect, unless re-evaluation by nondestructive methods or by surface conditioning shows that no unacceptable defect is present. Submit all records of nondestructive testing in accordance with paragraph STANDARDS OF ACCEPTANCE.

3.4 GOVERNMENT INSPECTION AND TESTING

In addition to the inspection and tests performed by the Contractor for quality control, the Government will perform inspection and testing for acceptance to the extent determined by the Contracting Officer. The costs of such inspection and testing will be borne by the Contractor if unsatisfactory welds are discovered, or by the Government if the welds are satisfactory. The work may be performed by the Government's own forces or under a separate contract for inspection and testing. The Government reserves the right to perform supplemental nondestructive and destructive tests to determine compliance with paragraph STANDARDS OF ACCEPTANCE.

3.5 CORRECTIONS AND REPAIRS

If inspection or testing indicates defects in the weld joints, repair defective welds using a qualified welder or welding operator as applicable. Conduct corrections in accordance with the requirements of AWS D1.1/D1.1M and the specifications. Repair all defects in accordance with the approved procedures. Repair defects discovered between passes before additional weld material is deposited. Wherever a defect is removed and repair by welding is not required, blend the affected area into the surrounding surface to eliminate sharp notches, crevices, or corners. After a defect is thought to have been removed, and before re-welding, examine the area by suitable methods to ensure that the defect has been eliminated. Repaired welds must meet the inspection requirements for the
original welds.

-- End of Section --
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 INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 201 (2006) AISC Certification Program for Structural Steel Fabricators
AISC 326 (2009) Detailing for Steel Construction
AISC 360 (2016) Specification for Structural Steel Buildings

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M (2015; Errata 1 2015; Errata 2 2016) Structural Welding Code - Steel

ASME INTERNATIONAL (ASME)

ASME B46.1 (2009) Surface Texture, Surface Roughness, Waviness and Lay

ASTM INTERNATIONAL (ASTM)

ASTM A500/A500M (2013) Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
1.2 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. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to
Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings
Fabrication Drawings Including Description of Connections; G

SD-03 Product Data
Shop Primer
Non-Shrink Grout

SD-07 Certificates
Steel
Bolts, Nuts, and Washers
AISC Fabrication Plant Quality Certification
AISC Erector Quality Certification
Welding Procedures and Qualifications
Welding Electrodes and Rods

1.3 AISC QUALITY CERTIFICATION

Work must be fabricated in an AISC Certified Fabrication Plant, Category Std. Submit AISC fabrication plant quality certification.

Work must be erected by an AISC Certified Erector, Category ASCE. Submit AISC erector quality certification.

1.4 QUALITY ASSURANCE

1.4.1 Fabrication Drawing Requirements
Submit fabrication drawings for approval prior to fabrication. Prepare in accordance with AISC 326 and AISC 325. Fabrication drawings must not be reproductions of contract drawings. Include complete information for the fabrication and erection of the structure's components, including the location, type, and size of bolts, welds, member sizes and lengths, connection details, blocks, copes, and cuts. Use AWS A2.4 standard welding symbols. Any deviations from the details shown on the contract drawings must be clearly highlighted on the fabrication drawings. Explain the reasons for any deviations from the contract drawings.

1.4.2 Certifications

1.4.2.1 Welding Procedures and Qualifications
Prior to welding, submit certification for each welder stating the type of welding and positions qualified for, the code and procedure qualified under, date qualified, and the firm and individual certifying the qualification tests.

Conform to all requirements specified in AWS D1.1/D1.1M.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

Provide the structural steel system, including shop primer, complete and
ready for use. Structural steel systems including materials, installation, workmanship, fabrication, assembly, erection, inspection, quality control, and testing must be provided in accordance with AISC 360, AISC 341, UFC 3-301-01 and UFC 3-310-04 except as modified in this contract.

2.2 STEEL

2.2.1 Structural Steel

Wide flange and WT shapes, ASTM A992/A992M. Angles, Channels and Plates, ASTM A36/A36M.

2.2.2 Structural Steel Tubing

ASTM A500/A500M, Grade B.

2.2.3 Steel Pipe

ASTM A53/A53M, Type E or S, Grade B, weight class STD (Standard).

2.3 BOLTS, NUTS, AND WASHERS

Submit the certified manufacturer's mill reports which clearly show the applicable ASTM mechanical and chemical requirements together with the actual test results for the supplied fasteners.

2.3.1 Foundation Anchorage

2.3.1.1 Anchor Rods

ASTM F1554 Gr 36, Class 1A.

2.3.1.2 Anchor Nuts

ASTM A563, Grade A, hex style.

2.3.1.3 Anchor Washers

ASTM F844.

2.3.1.4 Anchor Plate Washers

ASTM A36/A36M

2.4 STRUCTURAL STEEL ACCESSORIES

2.4.1 Welding Electrodes and Rods

AWS D1.1/D1.1M.

2.4.2 Non-Shrink Grout

ASTM C1107/C1107M, with no ASTM C827/C827M shrinkage.

2.4.3 Welded Shear Stud Connectors

ASTM A29/A29M, Type B. AWS D1.1/D1.1M.
2.5 FABRICATION

Fabrication must be in accordance with the applicable provisions of AISC 325. Fabrication and assembly must be done in the shop to the greatest extent possible. Punch, subpunch and ream, or drill bolt holes perpendicular to the surface of the member.

Compression joints depending on contact bearing must have a surface roughness not in excess of 500 micro inch as determined by ASME B46.1, and ends must be square within the tolerances for milled ends specified in ASTM A6/A6M.

Shop splices of members between field splices will be permitted only where indicated on the Contract Drawings. Splices not indicated require the approval of the Contracting Officer.

2.5.1 Markings

Prior to erection, members must be identified by a painted erection mark. Connecting parts assembled in the shop for reaming holes in field connections must be match marked with scratch and notch marks. Do not locate erection markings on areas to be welded. Do not locate match markings in areas that will decrease member strength or cause stress concentrations.

2.5.2 Shop Primer

SSPC Paint 20 or SSPC Paint 29, (zinc rich primer). Shop prime structural steel, except as modified herein, in accordance with SSPC PA 1. Do not prime steel surfaces embedded in concrete, galvanized surfaces, or surfaces within 0.5 inch of the toe of the welds prior to welding (except surfaces on which metal decking is to be welded). If flash rusting occurs, re-clean the surface prior to application of primer. Apply primer in accordance with endorsement "P1" of AISC 201 to a minimum dry film thickness of 2.0 mil.

Prior to assembly, prime surfaces which will be concealed or inaccessible after assembly. Do not apply primer in foggy or rainy weather; when the ambient temperature is below 45 degrees F or over 95 degrees F; or when the primer may be exposed to temperatures below 40 degrees F within 48 hours after application, unless approved otherwise by the Contracting Officer. Repair damaged primed surfaces with an additional coat of primer.

2.5.2.1 Cleaning

SSPC SP 6/NACE No.3, except steel exposed in spaces above ceilings, attic spaces, furred spaces, and chases that will be hidden to view in finished construction may be cleaned to SSPC SP 3 when recommended by the shop primer manufacturer. Maintain steel surfaces free from rust, dirt, oil, grease, and other contaminants through final assembly.

2.6 DRAINAGE HOLES

Adequate drainage holes must be drilled to eliminate water traps. Hole diameter must be 1/2 inch and location must be indicated on the detail drawings. Hole size and location must not affect the structural integrity.
PART 3   EXECUTION

3.1   ERECTION

a. Erection of structural steel, except as indicated in item b. below, must be in accordance with the applicable provisions of AISC 325.

b. For low-rise structural steel buildings (60 feet tall or less and a maximum of 2 stories), the structure must be erected in accordance with AISC DESIGN GUIDE 10.

After final positioning of steel members, provide full bearing under base plates and bearing plates using nonshrink grout. Place nonshrink grout in accordance with the manufacturer's instructions.

3.1.1   STORAGE

Material must be stored out of contact with the ground in such manner and location as will minimize deterioration.

3.2   CONNECTIONS

Except as modified in this section, connections not detailed must be designed in accordance with AISC 360. Build connections into existing work. Do not tighten anchor bolts set in concrete with impact torque wrenches. Holes must not be cut or enlarged by burning. Bolts, nuts, and washers must be clean of dirt and rust, and lubricated immediately prior to installation.

3.3   GAS CUTTING

Use of gas-cutting torch in the field for correcting fabrication errors will not be permitted on any major member in the structural framing. Use of a gas cutting torch will be permitted on minor members not under stress only after approval has been obtained from the Contracting Officer.

3.4   WELDING

Welding must be in accordance with AWS D1.1/D1.1M. Grind exposed welds smooth where indicated. Provide AWS D1.1/D1.1M qualified welders, welding operators, and tackers.

Develop and submit the Welding Procedure Specifications (WPS) for all welding, including welding done using prequalified procedures. Prequalified procedures may be submitted for information only; however, procedures that are not prequalified must be submitted for approval.

3.4.1   Removal of Temporary Welds, Run-Off Plates, and Backing Strips

Removal is not required.

3.5   SHOP PRIMER REPAIR

Repair shop primer in accordance with the paint manufacturer's recommendation for surfaces damaged by handling, transporting, cutting, welding, or bolting.
3.5.1 Field Priming

Steel exposed to the weather, or located in building areas without HVAC for control of relative humidity must be field primed. After erection, the field bolt heads and nuts, field welds, and any abrasions in the shop coat must be cleaned and primed with paint of the same quality as that used for the shop coat.

3.6 FIELD QUALITY CONTROL

Perform field tests, and provide labor, equipment, and incidentals required for testing. The Contracting Officer must be notified in writing of defective welds, bolts, nuts, and washers within 7 working days of the date of the inspection.

3.6.1 Welds

3.6.1.1 Visual Inspection

AWS D1.1/D1.1M. Furnish the services of AWS-certified welding inspectors for fabrication and erection inspection and testing and verification inspections.

Inspect proper preparation, size, gaging location, and acceptability of welds; identification marking; operation and current characteristics of welding sets in use.

-- End of Section --
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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 IRON AND STEEL INSTITUTE (AISI)

AISI D100 (1991; R 2008) Cold-Formed Steel Design Manual

ASTM INTERNATIONAL (ASTM)


1.2 SUBMITTALS

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SD-02 Shop Drawings

Fabrication Drawings; G

SD-03 Product Data
Accessories
Deck Units
Galvanizing Repair Paint
Mechanical Fasteners
Touch-Up Paint

SD-04 Samples
   Metal Roof Deck Units
   Flexible Closure Strips

SD-05 Design Data
   Deck Units; G

SD-07 Certificates
   Powder-Actuated Tool Operator
   Fire Safety
   Wind Storm Resistance
   Manufacturer's Certificate

SD-11 Closeout Submittals
   Recycled Content of Steel Products; S

1.3 QUALITY ASSURANCE

1.3.1 Deck Units

Furnish deck units and accessory products from a manufacturer regularly engaged in manufacture of steel decking. Provide manufacturer's certificates attesting that the decking material meets the specified requirements.

1.3.2 Certification of Powder-Actuated Tool Operator

Provide manufacturer's certificate attesting that the operators are authorized to use the low velocity powder-actuated tool.

1.3.3 Regulatory Requirements

1.3.3.1 Fire Safety

Test roof deck as a part of a roof deck construction assembly of the type used for this project, listing as fire classified in the UL Fire Resistance, or listing as Class I construction in the FM APP GUIDE, and so labeled.
1.3.3.2 Wind Storm Resistance

Provide roof construction assembly capable of withstanding a nominal uplift pressure of 60 pounds per square foot when tested in accordance with the uplift pressure test described in the FM DS 1-28R or as described in UL 580 and in general compliance with UFC 3-301-01.

1.3.4 Fabrication Drawings

Show type and location of units, location and sequence of connections, bearing on supports, methods of anchoring, attachment of accessories, adjusting plate details, cant strips, ridge and valley plates, metal closure strips, size and location of holes to be cut and reinforcement to be provided, the manufacturer's erection instructions and other pertinent details.

1.4 DELIVERY, STORAGE, AND HANDLING

Deliver deck units to the site in a dry and undamaged condition. Store and handle steel deck in a manner to protect it from corrosion, deformation, and other types of damage. Do not use decking for storage or as working platform until units have been fastened into position. Exercise care not to damage material or overload decking during construction. The maximum uniform distributed storage load must not exceed the design live load. Stack decking on platforms or pallets and cover with weathertight ventilated covering. Elevate one end during storage to provide drainage. Maintain deck finish at all times to prevent formation of rust. Repair deck finish using touch-up paint. Replace damaged material.

1.5 DESIGN REQUIREMENTS FOR ROOF DECKS

1.5.1 Properties of Sections

Properties of metal roof deck sections must comply with engineering design width as limited by the provisions of AISI D100.

1.5.2 Allowable Loads

Indicate total uniform dead and live load for detailing purposes.

PART 2 PRODUCTS

2.1 DECK UNITS

Submit manufacturer's design calculations, or applicable published literature for the structural properties of the proposed deck units.

Recycled content of steel products: provide products with an average recycled content of steel products so postconsumer recycled content plus one half of preconsumer recycled content not less than 25 percent.

2.1.1 Roof Deck

Conform to ASTM A792/A792M or ASTM A1008/A1008M for deck used in conjunction with insulation and built-up roofing. Fabricate roof deck units of the steel design thickness required by the design drawings and galvanized. Furnish sample of Metal Roof Deck Units used to illustrate actual cross section dimensions and configurations.
2.1.2 Length of Deck Units

Provide deck units of sufficient length to span three or more spacings where possible.

2.1.3 Touch-Up Paint

Provide a high zinc-dust content paint for regalvanizing welds in galvanized steel conforming to ASTM A780/A780M.

Provide touch-up paint for zinc-coated units of an approved galvanizing repair paint with a high-zinc dust content. Touch-up welds with paint conforming to SSPC Paint 20 in accordance with ASTM A780/A780M. Maintain finish of deck units and accessories by using touch-up paint whenever necessary to prevent the formation of rust.

2.2 ACCESSORIES

Provide accessories of same material as deck, unless specified otherwise. Provide manufacturer's standard type accessories, as specified.

2.2.1 Adjusting Plates

Provide adjusting plates, or segments of deck units, of same thickness and configuration as deck units in locations too narrow to accommodate full size units. Provide factory cut plates of predetermined size where possible.

2.2.2 End Closures

Fabricated of sheet metal by the deck manufacturer. Provide end closures minimum 0.0295 inch thick to close open ends at eaves, and openings through deck.

2.2.3 Flexible Closure Strips for Roof Decks

Provide strips made of vulcanized, closed-cell, synthetic rubber material specified and premolded to the configuration required to provide tight-fitting closures at open ends and sides of steel roof decking. Furnish one sample of each type Flexible Closure Strips, 12 inch long. Conforming to ASTM D1056, Grade 2A1, with the following additional properties:

Brittleness temperature of minus 40 degrees F when tested in accordance with ASTM D746.

Flammability resistance with a flame spread rating of less than 25 when tested in accordance with ASTM E84.

Resistance to ozone must be "no cracks" after exposure of a sample kept under a surface tensile strain of 25 percent to an ozone concentration of 100 parts per million of air by volume in air for 100 hours at 104 degrees F and tested in accordance with ASTM D1149.

Provide a elastomeric type adhesive as recommended by the manufacturer of the flexible closure strips.
2.2.4 Sheet Metal Collar

Where deck is cut for passage of pipes, ducts, columns, etc., and deck is to remain exposed, provide a neatly cut sheet metal collar to cover edges of deck. Do not cut deck until after installation of supplemental supports.

2.2.5 Cover Plates

Sheet metal to close panel edge and end conditions, and where panels change direction or butt. Polyethylene-coated, self-adhesive, 2 inch wide joint tape may be provided in lieu of cover plates on flat-surfaced decking butt joints.

Fabricate cover plates for abutting floor deck units from the specified structural-quality steel sheets not less than nominal 18 gage thick before galvanizing. Provide 6 inch wide cover plates and form to match the contour of the floor deck units.

2.2.6 Access Hole Covers

Sheet metal, minimum 0.0474 inch thick.

2.2.7 Cant Strips for Roof Decks

Fabricate cant strips from the specified commercial-quality steel sheets not less than nominal 0.0358 inch thick before galvanizing. Bend strips to form a 45-degree cant not less than 5 inch wide, with top and bottom flanges a minimum 3 inch wide. Length of strips 10 feet.

2.2.8 Ridge and Valley Plates for Roof Decks

Fabricate plates from the specified structural-quality steel sheets, not less than nominal 0.0358 inch thick before galvanizing. Provide plates of minimum 4-1/2 inch wide and bent to provide tight fitting closures at ridges and valleys. Provide a minimum length of ridge and valley plates of 10 feet.

2.2.9 Metal Closure Strips for Roof Decks

Fabricate strips from the specified commercial-quality steel sheets not less than nominal 0.0358 inch thick before galvanizing. Provide strips from the configuration required to provide tight-fitting closures at open ends and sides of steel roof decking.

2.2.10 Galvanized Steel Angles for Roof Decks

Provide hot-rolled carbon steel angles conforming to ASTM A36/A36M, and hot-dip galvanized in accordance with ASTM A123/A123M.

2.2.11 Mechanical Fasteners

Provide self-drilling screws, for anchoring the deck to structural supports and adjoining units as indicated.

2.2.12 Miscellaneous Accessories

Furnish the manufacturer's standard accessories to complete the deck installation. Furnish metal accessories of the same material as the deck and with the minimum design thickness as follows: saddles, 0.0474 inch welding washers, 0.0598 inch other metal accessories, 0.0358 inch unless
PART 3 EXECUTION

3.1 EXAMINATION

Prior to installation of decking units and accessories, examine worksite to verify that as-built structure will permit installation of decking system without modification.

3.2 INSTALLATION

Install steel deck units in accordance with 29 CFR 1926, Subpart R - Steel Erection, ANSI/SDI QA/QC, SDI DDMO3 and approved shop drawings. Place units on structural supports, properly adjusted, leveled, and aligned at right angles to supports before permanently securing in place. Damaged deck and accessories including material which is permanently stained or contaminated, deformed, or with burned holes shall not be installed. Extend deck units over three or more supports unless absolutely impractical. Report inaccuracies in alignment or leveling to the Contracting Officer and make necessary corrections before permanently anchoring deck units. Locate deck ends over supports only. Lap 2 inch deck ends. Do not use unanchored deck units as a work or storage platform. Permanently anchor units placed by the end of each working day. Do not support suspended ceilings, light fixtures, ducts, utilities, or other loads by steel deck unless indicated. Distribute loads by appropriate means to prevent damage. Neatly fit.

3.2.1 Attachment

Immediately after placement and alignment, and after correcting inaccuracies, permanently fasten steel deck units to structural supports and to adjacent deck units as indicated on the design drawings and in accordance with manufacturer's recommended procedure. Clamp or weight deck units to provide firm contact between deck units and structural supports while performing fastening. Attachment of adjacent deck units by button-punching is prohibited.

3.2.1.1 Mechanical Fastening

Anchor deck to structural supports and adjoining units with mechanical fasteners. Drive screws to properly clamp deck to supporting steel.

3.2.1.2 Sidelap Fastening

Lock sidelaps between adjacent roof deck units together by screws as indicated.

3.2.2 Openings

Cut or drill all holes and openings required and be coordinated with the drawings, specifications, and other trades. Frame and reinforce openings through the deck in conformance with SDI DDP. Reinforce holes and openings 6 to 12 inch across by 0.0474 inch thick steel sheet at least 12 inch wider and longer than the opening and be fastened to the steel deck at each corner of the sheet and at a maximum of 6 inch on center. Reinforce holes and openings larger than 12 inch by cold-formed metal framing installed perpendicular to the cold-formed metal trusses and supported by the adjacent steel joists. Install steel channels or angles perpendicular to
the deck ribs and fasten to the channels or angles perpendicular to the steel joists.

3.2.3 Deck Damage

SDI MOC2, for repair of deck damage.

3.2.4 Touch-Up Paint

3.2.4.1 Roof Deck

After roof decking installation, wire brush, clean, and touchup paint the scarred areas on top and bottom surfaces of metal roof decking. The scarred areas include welds, weld scars, bruises, and rust spots. Touchup galvanized surfaces with galvanizing repair paint. Touchup painted surfaces with repair paint of painted surfaces.

3.2.5 Accessory Installation

3.2.5.1 Adjusting Plates

Provide in locations too narrow to accommodate full-size deck units and install as shown on shop drawings.

3.2.5.2 End Closures

Provide end closure to close open ends of cells at columns, walls, and openings in deck.

3.2.5.3 Access Hole Covers

Provide access whole covers to seal holes cut in decking to facilitate welding of the deck to structural supports.

3.3 CANT STRIPS FOR ROOF DECKS

Provide strips to be fusion welded to surface of roof decking, secured to wood nailers by galvanized screws or to steel framing by galvanized self-tapping screws or welds. Do not exceed spacing of welds and fasteners of 12 inch. Lap end joints a minimum 3 inch and secure with galvanized sheet metal screws spaced a maximum 4 inch on center.

3.4 RIDGE AND VALLEY PLATES FOR ROOF DECKS

Provide plates to be fusion welded to top surface of roof decking. Lap end joints a minimum 3 inch. For valley plates, provide endlaps to be in the direction of water flow.

3.5 CLOSURE STRIPS FOR ROOF DECKS

Provide closure strips at open, uncovered ends and edges of the roof decking and in voids between roof decking and top of walls and partitions where indicated. Install closure strips in position in a manner to provide a weathertight installation.

3.6 ROOF INSULATION SUPPORT FOR ROOF DECKS

Provide metal closure strips for support of roof insulation where rib openings in top surface of metal roof decking occur adjacent to edges and
openings. Weld metal closure strips in position.

3.7 CLEANING AND PROTECTION FOR ROOF DECKS

Upon completion of the deck, sweep surfaces clean and prepare for installation of the roofing.

3.8 FIELD QUALITY CONTROL

3.8.1 Decks Not Receiving Concrete

Inspect the decking top surface for distortion after installation. For roof decks not receiving concrete, verify distortion by placing a straight edge across three adjacent top flanges. The maximum allowable gap between the straight edge and the top flanges should not exceed manufacturing and construction tolerances of supporting members. When gap is more than the allowable, provide corrective measures or replacement. Reinspect decking after performing corrective measures or replacement.

-- End of Section --
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PART 1   GENERAL

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AMERICAN CONCRETE INSTITUTE INTERNATIONAL (ACI)

ACI 318 (2014; Errata 1-2 2014; Errata 3-5 2015; Errata 6 2016; Errata 7 2017) Building Code Requirements for Structural Concrete and Commentary

AMERICAN IRON AND STEEL INSTITUTE (AISI)

AISI S100 (2012) North American Specification for the Design of Cold-Formed Steel Structural Members
AISI S200 (2007) North American Standard for Cold-Formed Steel Framing - General Provision
AISI S201 (2007) North American Standard for Cold-Formed Steel Framing - Product Data
AISI S202 (2011) Code of Standard Practice for Cold-formed Steel Structural Framing
AISI S213 (2007; Suppl 1 2009) North American Standard for Cold-Formed Steel Framing - Lateral Design
AISI S214 (2012) North American Standard for Cold-Formed Steel Framing - Truss Design

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M (2015; Errata 1 2015; Errata 2 2016) Structural Welding Code - Steel

ASTM INTERNATIONAL (ASTM)

<table>
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<tr>
<th>Standard</th>
<th>Description</th>
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<tr>
<td>ASTM C1007</td>
<td>(2011a) Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories</td>
</tr>
<tr>
<td>ASTM C1513</td>
<td>(2013) Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections</td>
</tr>
<tr>
<td>ASTM C955</td>
<td>(2017) Standard Specification for Cold-Formed Steel Structural Framing Members</td>
</tr>
<tr>
<td>ASTM F2329</td>
<td>(2013) Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners</td>
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**INTERNATIONAL CODE COUNCIL (ICC)**

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**U.S. DEPARTMENT OF DEFENSE (DOD)**

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<tbody>
<tr>
<td>UFC 3-301-01</td>
<td>(2013; with Change 1) Structural Engineering</td>
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   Framing Components; G
SD-03 Product Data
   Steel Studs, Joists, Tracks, Bracing, Bridging and Accessories
SD-05 Design Data
   Metal Framing Calculations; G
SD-07 Certificates
   Load-Bearing Cold-Formed Metal Framing Welds
SD-11 Closeout Submittals
   Recycled Content of Steel Products; S

1.3 DELIVERY, STORAGE, AND HANDLING

Steel framing and related accessories shall be stored and handled in accordance with the AISI S202, "Code of Standard Practice for Cold-Formed Steel Structural Framing".

1.4 LOAD-BEARING COLD-FORMED METAL FRAMING

Include bracing, fastenings, and other accessories necessary for complete installation. Framing members shall have the structural properties indicated. Where physical structural properties are not indicated, they shall be as necessary to withstand all imposed loads. Design framing in accordance with AISI S100. Non-load-bearing metal framing, furring, and ceiling suspension systems are specified in Section 09 22 00 SUPPORTS FOR PLAS TR AND GYPSUM BOARD. Metal suspension systems for acoustical ceilings are specified in Section 09 51 00 ACOUSTICAL CEILINGS.

Submit mill certificates or test reports from independent testing agency, qualified in accordance with ASTM E329, showing that the steel sheet used in the manufacture of each cold-formed component complies with the minimum yield strengths and uncoated steel thickness specified. Test reports shall be based on the results of three coupon tests in accordance with ASTM A370.

1.5 MAXIMUM DEFLECTION

Deflections of structural members shall not exceed the more restrictive of the limitations of ICC IBC and UFC 3-301-01.
1.6 QUALITY ASSURANCE

a. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a registered professional engineer licensed in the state of Mississippi.

b. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E329 for testing indicated.

c. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

d. Welding Qualifications: Qualify procedures and personnel according to the following:

   (1) AWS D1.1/D1.1M, "Structural Welding Code - Steel".

   (2) AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel".

f. AISI Specifications and Standards: Comply with:

   (1) AISI S100, "North American Specification for the Design of Cold-Formed Steel Structural Members".

   (2) AISI S200, "North American Standard for Cold-Formed Steel Framing - General Provision".

   (3) AISI S201, "North American Standard for Cold-Formed Steel Framing - Product Data".

   (4) AISI S202, "Code of Standard Practice for Cold-Formed Steel Structural Framing".

   (5) AISI S213, "North American Standard for Cold-Formed Steel Framing - Lateral Design".

   (6) AISI S214, "North American Standard for Cold-Formed Steel Framing - Truss Design".

1.6.1 Drawing Requirements

Submit framing components to show sizes, thicknesses, layout, material designations, methods of installation, and accessories including the following:

a. Cross sections, plans, and/or elevations showing component types and locations for each framing application; including shop coatings and material thicknesses for each framing component.

b. Connection details showing fastener type, quantity, location, and other information to assure proper installation.
c. Drawings depicting panel configuration, dimensions, components, locations, and construction sequence if the Contractor elects to install prefabricated/prefinished frames.

Sign and seal fabrication drawings by a registered professional engineer licensed in the state of Mississippi.

1.6.2 Design Data Required

Submit metal framing calculations with design criteria and structural loading to verify sizes, thickness, and spacing of members and connections signed and sealed by a registered professional engineer. Show methods and practices used in installation.

PART 2 PRODUCTS

2.1 STEEL STUDS, JOISTS, TRACKS, BRACING, BRIDGING AND ACCESSORIES

Framing components shall comply with ASTM C955 and the following.

a. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one half of preconsumer recycled content not less than 25 percent.

b. Steel Sheet: ASTM A1003/A1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:

   (1) Grade: As required by structural performance.

   (2) Coating: G90 (Z275).

c. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

   (1) Minimum Base-Metal Thickness: 0.0329 inch.

   (2) Flange Width: As required by structural performance.

d. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:

   (1) Minimum Base-Metal Thickness: 0.0428 inch.

   (2) Flange Width: As required by structural performance.

e. Roof Truss Members: Manufacturer's standard steel sections, and as follows:

   (1) Minimum Base-Metal Thickness: 0.0428 inch.

2.2 MARKINGS

Studs and track shall have product markings stamped on the web of the section. The markings shall be repeated throughout the length of the member at a maximum spacing of 4 feet on center and shall be legible and
easily read. The product marking shall include the following:

a. An ICC number.

b. Manufacturer's identification.

c. Minimum delivered uncoated steel thickness.

d. Protective coating designator.

e. Minimum yield strength.

2.3 CONNECTIONS

2.3.1 Steel-To-Concrete Connections

b. Post-Installed Concrete Anchors: Adhesive or expansion anchors fabricated from corrosion-resistant materials with allowable load capacities in accordance with ICC-ES AC193 and ACI 318 greater than or equal to the design load as determined by testing per ASTM E488/E488M conducted by a qualified testing agency.

c. Power-Actuated Fasteners: Fabricated from corrosion-resistant materials with allowable load capacities in accordance with ICC-ES AC 70 greater than or equal to the design load as determined by testing per ASTM E1190 conducted by a qualified testing agency.

2.3.2 Steel-To-Steel Connections

a. Screws: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping steel screws of the type and size indicated. Provide low-profile head beneath sheathing and manufacturer's standard elsewhere. Electroplated to a minimum of 5 micron zinc coating per ASTM F1941 or hot-dipped galvanized per ASTM A123/A123M or ASTM A153/A153M.

b. Bolts: ASTM A307 coated by hot-dip process per ASTM F2329 or zinc-coated by mechanical-deposition process per ASTM B695, Class 55.

c. Welding Electrodes: Comply with AWS standards.

2.4 PLASTIC GROMMETS

Supply plastic grommets for stud webs as recommended by stud manufacturer, to protect electrical wires and plumbing piping. Prevent metal-to-metal contact between wiring/piping and studs.

2.5 SEALER GASKET

Closed-cell neoprene foam, 1/4-inch thick, selected from manufacturer's standard widths to match width of bottom track on concrete slab or foundation.
PART 3 EXECUTION

3.1 TRUSS FABRICATION

a. Fabricate cold-formed steel trusses and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

b. Truss must be fabricated either on site or off site prior to erection.

c. Fabricate trusses using jigs or templates.

d. Splices can only occur at joints.

e. Cut truss members by sawing or shearing: do not torch cut.

f. Fasten cold-formed steel truss members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator.

g. Fasten other materials to cold-formed steel trusses by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.

h. Reinforce, stiffen, and brace trusses to withstand handling, delivery, and erection stresses. Lift fabricated trusses to prevent damage or permanent distortion.

3.2 FASTENING

Fasten framing members together by welding or by using self-drilling, self-tapping screws. Electrodes and screw connections shall be as required and indicated in the design calculations.

3.2.1 Welds

All welding shall be performed in accordance with AWS D1.3/D1.3M, as modified by AISI S100. All welders, welding operations, and welding procedures shall be qualified according to AWS D1.3/D1.3M. Submit certified copies of welder qualifications test records showing qualification in accordance with AWS D1.3/D1.3M. All welds shall be cleaned and coated with rust inhibitive galvanizing paint. Do not field weld materials lighter than 43 mils.

3.2.2 Screws

Screws shall be of the self-drilling self-tapping type, size, and location as required. Screw penetration through joined materials shall not be less than three exposed threads. Minimum spacings and edge distances for screws shall be as specified in AISI S100. Screws covered by sheathing materials shall have low profile heads.

3.2.3 Anchors

Anchors shall be of the type, size, and location as required.
3.2.4 Powder-Actuated Fasteners

Powder-actuated fasteners shall be of the type, size, and location as required.

3.3 INSTALLATION

Install cold-formed framing in accordance with ASTM C1007 and AISI S200.

Install cold-formed steel framing according to AISI S202 and to manufacturer's written instructions unless more stringent requirements are indicated.

3.3.1 Tracks

Provide accurately aligned runners at top and bottom of studs. Install sealer gasket under bottom of track on concrete slab or foundation. Anchor tracks as indicated in design calculations. Butt weld joints in tracks or splice with stud inserts. Fasteners shall be at least 3 inches from the edge of concrete slabs.

3.3.2 Studs

Cut studs square and set with firm bearing against webs of top and bottom tracks. Position studs vertically in tracks and space as indicated in design. Do not splice studs. Provide at least two studs at jambs of doors and other openings 2 feet wide or larger. Provide jack studs over openings, as necessary, to maintain indicated stud spacing. Provide tripled studs at corners, positioned to receive interior and exterior finishes. Fasten studs to top and bottom tracks by welding or screwing both flanges to the tracks. Framed wall openings shall include headers and supporting components as shown on the drawings. Headers shall be installed in all openings that are larger than the stud spacing in a wall. In curtain wall construction, provide for vertical movement where studs connect to the structural frame. Provide horizontal bracing in accordance with the design calculations and AISI S100. Bracing shall be not less than the following:

<table>
<thead>
<tr>
<th>LOAD</th>
<th>HEIGHT</th>
<th>BRACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind load only</td>
<td>Up to 10 feet</td>
<td>One row at mid-height</td>
</tr>
<tr>
<td></td>
<td>Over 10 feet</td>
<td>Rows 5'-0&quot; o.c. maximum</td>
</tr>
<tr>
<td>Axial load</td>
<td>Up to 10 feet</td>
<td>Two rows at 1/3 points</td>
</tr>
<tr>
<td></td>
<td>Over 10 feet</td>
<td>Rows 3'-4&quot; o.c. maximum</td>
</tr>
</tbody>
</table>

3.3.3 Joists and Trusses

b. Install, bridge, and brace cold-formed steel trusses according to AISI S200, AISI S214, AISI's "Code of Standard Practice for Cold-Formed
Steel Structural Framing," and manufacturer's written instructions unless more stringent requirements are indicated.

c. Install temporary bracing and supports. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

d. Do not alter, cut, or remove framing members or connections of trusses.

3.3.4 Erection Tolerances

a. Framing members which will be covered by finishes such as wallboard, plaster, or ceramic tile set in a mortar setting bed, shall be within the following limits:

(1) Layout of walls and partitions: 1/4 inch from intended position;

(2) Plates and runners: 1/4 inch in 8 feet from a straight line;

(3) Studs: 1/4 inch in 8 feet out of plumb, not cumulative; and

(4) Face of framing members: 1/4 inch in 8 feet from a true plane.

b. Framing members which will be covered by ceramic tile set in dry-set mortar, latex-portland cement mortar, or organic adhesive shall be within the following limits:

(1) Layout of walls and partitions: 1/4 inch from intended position;

(2) Plates and runners: 1/8 inch in 8 feet from a straight line;

(3) Studs: 1/8 inch in 8 feet out of plumb, not cumulative; and

(4) Face of framing members: 1/8 inch in 8 feet from a true plane.

-- End of Section --
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PART 1   GENERAL

1.1 REFERENCES

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)


ARCHITECTURAL WOODWORK INSTITUTE (AWI)

AWI AWS (2nd Edition) Architectural Woodwork Standards

ASTM INTERNATIONAL (ASTM)


ASTM F547 (2006; R 2012) Nails for Use with Wood and Wood-Base Materials

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

ANSI/BHMA A156.9 (2015) Cabinet Hardware

COMPOSITE PANEL ASSOCIATION (CPA)

CPA A208.1 (2016) Particleboard

CPA A208.2 (2016) Medium Density Fiberboard (MDF) for Interior Applications

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

ANSI/NEMA LD 3 (2005) Standard for High-Pressure Decorative Laminates

SCIENTIFIC CERTIFICATION SYSTEMS (SCS)

SCS SCS Global Services (SCS) Indoor Advantage
UL ENVIRONMENT (ULE)
ULE Greenguard UL Greenguard Certification Program

WINDOW AND DOOR MANUFACTURERS ASSOCIATION (WDMA)
ANSI/WDMA I.S.1A (2013) Interior Architectural Wood Flush Doors

1.2 SYSTEM DESCRIPTION

Work in this section includes laminate clad custom casework cabinets vanities as shown on the drawings and as described in this specification. This Section includes high-pressure laminate surfacing and cabinet hardware. Comply with EPA requirements in accordance with Section 01 33 29 SUSTAINABILITY REPORTING. All exposed and semi-exposed surfaces, whose finish is not otherwise noted on the drawings or finish schedule, shall be sanded smooth and shall receive a clear finish of polyurethane. Wood finish may be shop finished or field applied in accordance with Section 09 90 00 PAINTS AND COATINGS.

1.3 SUSTAINABILITY REPORTING

Materials in this technical specification may contribute towards contract compliance with sustainability requirements. See Section 01 33 29 SUSTAINABILITY REPORTING for project requirements.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Architect's approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings
  Shop Drawings
  Installation

SD-03 Product Data
  Wood Materials
  Wood Finishes
  Finish Schedule
  Certification

SD-04 Samples
  Plastic Laminates
  Cabinet Hardware

SD-07 Certificates
  Quality Assurance
  Laminate Clad Casework
1.5 QUALITY ASSURANCE

1.5.1 General Requirements

Unless otherwise noted on the drawings, all materials, construction methods, and fabrication shall conform to and comply with the custom grade quality standards as outlined in AWI AWS, Section for laminate clad cabinets. These standards shall apply in lieu of omissions or specific requirements in this specification. Contractors and their personnel engaged in the work shall be able to demonstrate successful experience with work of comparable extent, complexity and quality to that shown and specified. Submit a quality control statement which illustrates compliance with and understanding of AWI AWS requirements, in general, and the specific AWI AWS requirements provided in this specification. The quality control statement shall also certify a minimum of ten years Contractor's experience in laminate clad casework fabrication and construction. The quality control statement shall provide a list of a minimum of five successfully completed projects of a similar scope, size, and complexity.

1.5.2 Mock-ups

1.5.3 Sustainable Design Certification

Product shall be third party certified in accordance with ULE Greenguard Gold, SCS Scientific Certification Systems Indoor Advantage Silver or equal. Certification shall be performed annually and shall be current.

1.6 DELIVERY, STORAGE, AND HANDLING

Casework may be delivered knockdown or fully assembled. Deliver all units to the site in undamaged condition, stored off the ground in fully enclosed areas, and protected from damage. The storage area shall be well ventilated and not subject to extreme changes in temperature or humidity.

1.7 SEQUENCING AND SCHEDULING

Coordinate work with other trades. Units shall not be installed in any room or space until painting, and ceiling installation are complete within the room where the units are located. Floor cabinets shall be installed before finished flooring materials are installed.

PART 2 PRODUCTS

2.1 WOOD MATERIALS

2.1.1 Lumber

a. All framing lumber shall be kiln-dried Grade III to dimensions as shown on the drawings. Frame front, where indicated on the drawings, shall be nominal 3/4 inch hardwood.

b. Standing or running trim casework components, which are specified to receive a transparent finish, shall be Red Oak hardwood species, plain sawn. AWI grade shall be custom. Location, shape, and dimensions shall be as indicated on the drawings.
2.1.2 Panel Products

2.1.2.1 Plywood

All plywood panels used for framing purposes shall be veneer core hardwood plywood, AWI AWS Grade AA. Nominal thickness of plywood panels shall be as indicated in this specification and on the drawings.

2.1.2.2 Particleboard

All particleboard shall be industrial grade, medium density (40 to 50 pounds per cubic foot), 3/4 inch thick. A moisture-resistant particleboard in grade Type 2-M-2 or 2-M-3 shall be used as the substrate for plastic laminate covered countertops backsplashes components as located on the drawings and other areas subjected to moisture. Particleboard shall meet the minimum standards listed in ASTM D1037 and CPA A208.1.

2.1.2.3 Medium Density Fiberboard

Medium density fiberboard (MDF) shall be an acceptable panel substrate where noted on the drawings. Medium density fiberboard shall meet the minimum standards listed in CPA A208.2.

2.2 SOLID POLYMER MATERIAL

Solid surfacing casework components shall conform to the requirements of Section 06 61 16 SOLID SURFACING FABRICATIONS.

2.3 HIGH PRESSURE DECORATIVE LAMINATE (HPDL)

All plastic laminates shall meet the requirements of ANSI/NEMA LD 3 and ANSI A161.2 for high-pressure decorative laminates. Design, colors, surface finish and texture, and locations shall be as indicated on the drawings. Submit two samples of each plastic laminate pattern and color. Samples shall be a minimum of 5 by 7 inches in size. Plastic laminate types and nominal minimum thicknesses for casework components shall be as indicated in the following paragraphs.

2.3.1 Horizontal General Purpose Standard (HGS) Grade

Horizontal general purpose standard grade plastic laminate shall be 0.048 inches (plus or minus 0.005 inches) in thickness. This laminate grade is intended for horizontal surfaces where postforming is not required.

2.3.2 Vertical General Purpose Standard (VGS) Grade

Vertical general purpose standard grade plastic laminate shall be 0.028 inches (plus or minus 0.004 inches) in thickness. This laminate grade is intended for exposed exterior vertical surfaces of casework components where postforming is not required.

2.3.3 Horizontal General Purpose Postformable (HGP) Grade

Horizontal general purpose postformable grade plastic laminate shall be 0.042 inches (plus or minus 0.005 inches) in thickness. This laminate grade is intended for horizontal surfaces where post forming is required.
2.3.4 Vertical General Purpose Postformable (VGP) Grade

Vertical general purpose postformable grade plastic laminate shall be 0.028 inches (plus or minus 0.004 inches) in thickness. This laminate grade is intended for exposed exterior vertical surfaces of components where postforming is required for curved surfaces.

2.3.5 Horizontal General Purpose Fire Rated (HGP) Grade

Horizontal general purpose fire rated grade plastic laminate shall be 0.048 inches (plus or minus 0.005 inches) in thickness. Laminate grade shall have a class 1, class A fire rating in accordance with ASTM E84.

2.3.6 Vertical General Purpose Fire Rated (VGF) Grade

Vertical general purpose fire rated grade plastic laminate shall be 0.028 inches (plus or minus 0.004 inches) in thickness. This laminate grade shall have a class 1, class A fire rating in accordance with ASTM E84.

2.3.7 Cabinet Liner Standard (CLS) Grade

Cabinet liner standard grade plastic laminate shall be 0.020 inches in thickness. This laminate grade is intended for light duty semi-exposed interior surfaces of casework components.

2.3.8 Backing Sheet (BK) Grade

Undecorated backing sheet grade laminate is formulated specifically to be used on the backside of plastic laminated panel substrates to enhance dimensional stability of the substrate. Backing sheet thickness shall be 0.020 inches. Backing sheets shall be provided for all laminated casework components where plastic laminate finish is applied to only one surface of the component substrate.

2.4 THERMOSET DECORATIVE OVERLAYS (MELAMINE)

Thermoset decorative overlays (melamine panels) shall be used for casework cabinet interior, drawer interior, all semi-exposed interior surfaces.

2.5 EDGE BANDING

Edge banding for casework doors and drawer fronts shall be PVC vinyl and shall be 0.020 inch thick. Material width shall be as indicated on the drawings. Color and pattern shall be as indicated on the drawings.

2.6 VINYL COUNTERTOP EDGE

Where located on the drawings, vinyl edging for countertops shall be a tee-mould anchor type with a flat edge profile. Finished width shall be as indicated on the drawings. Color shall be as indicated on the drawings.

2.7 CABINET HARDWARE

Submit one sample of each cabinet hardware item specified to include hinges, pulls, drawer glides. All hardware shall conform to ANSI/BHMA A156.9, unless otherwise noted, and shall consist of the following components:
2.7.1 Door Hinges
Self-closing type, BHMA No. 626.

2.7.2 Cabinet Pulls
Wire pull type, BHMA No. 626.

2.7.3 Drawer Slide
Side mounted drawer slide type, BHMA No. 626 with full extension and a minimum 75 pound load capacity. Slides shall include an integral stop to avoid accidental drawer removal.

2.7.4 Adjustable Shelf Support System
Recessed (mortised) metal standards, BHMA No. BO4071, finish: 626. Support clips for the standards shall be open type, BHMA No. B04091.

2.8 FASTENERS
Nails, screws, and other suitable fasteners shall be the size and type best suited for the purpose and shall conform to ASTM F547 where applicable.

2.9 ADHESIVES, CAULKS, AND SEALANTS

2.9.1 Adhesives
Adhesives shall be of a formula and type recommended by AWI. Adhesives shall be selected for their ability to provide a durable, permanent bond and shall take into consideration such factors as materials to be bonded, expansion and contraction, bond strength, fire rating, and moisture resistance. Adhesives shall meet local regulations regarding VOC emissions and off-gassing.

2.9.1.1 Wood Joinery
Adhesives used to bond wood members shall be a Type II for interior use urea-formaldehyde resin formula. Adhesives shall withstand a bond test as described in ANSI/WDMA I.S.1A.

2.9.1.2 Laminate Adhesive
Adhesive used to join high-pressure decorative laminate to wood shall be a water-based contact adhesive. PVC edgebanding shall be adhered using a polymer-based hot melt glue.

2.9.2 Caulk
Caulk used to fill voids and joints between laminated components and between laminated components and adjacent surfaces shall be clear, 100 percent silicone.

2.9.3 Sealant
Sealant shall be of a type and composition recommended by the substrate manufacturer to provide a moisture barrier at sink cutouts and all other locations where unfinished substrate edges may be subjected to moisture.
2.10 WOOD FINISHES

Paint, stain, varnish and their applications required for laminate clad casework components shall be as indicated in Section 09 90 00 PAINTS AND COATINGS.

2.11 FABRICATION

Verify field measurements as indicated in the shop drawings before fabrication. Fabrication and assembly of components shall be accomplished at the shop site to the maximum extent possible. Construction and fabrication of cabinets and their components shall meet or exceed the requirements for AWI custom grade unless otherwise indicated in this specification. Cabinet style, in accordance with AWI AWS, Section 400-G descriptions, shall be flush overlay.

2.11.1 Base and Wall Cabinet Case Body

2.11.1.1 Cabinet Components

Frame members shall be glued-together, kiln-dried hardwood lumber. Top corners, bottom corners, and cabinet bottoms shall be braced with either hardwood blocks or water-resistant glue and nailed in place metal or plastic corner braces. Cabinet components shall be constructed from the following materials and thicknesses:

2.11.1.1.1 Body Members (Ends, Divisions, Bottoms, and Tops)

3/4 inch veneer core plywood panel product

2.11.1.1.2 Face Frames and Rails

3/4 inch hardwood lumber

2.11.1.1.3 Shelving

3/4 inch veneer core plywood panel product

2.11.1.1.4 Cabinet Backs

1/4 inch veneer core plywood panel product

2.11.1.1.5 Drawer Sides, Backs, and Subfronts

1/2 inch hardwood lumber

2.11.1.1.6 Drawer Bottoms

1/4 inch veneer core plywood panel product

2.11.1.1.7 Door and Drawer Fronts

3/4-inch veneer core plywood panel product

2.11.1.2 Joinery Method for Case Body Members

2.11.1.2.1 Tops, Exposed Ends, and Bottoms

a. Steel "European" assembly screws (1-1/2 inch from end, 5 inch on
2.11.1.2 Exposed End Corner and Face Frame Attachment

2.11.1.2.1 Mitered Joint
lock miter or spline or biscuit, glued under pressure (no visible fasteners)

2.11.1.2.2 Non-Mitered Joint (90 degree)
butt joint glued under pressure (no visible fasteners)

2.11.1.2.3 Butt Joint

glued and nailed

2.11.1.2.3 Cabinet Backs (Wall Hung Cabinets)

Wall hung cabinet backs must not be relied upon to support the full weight of the cabinet and its anticipated load for hanging/mounting purposes. Method of back joinery and hanging/mounting mechanisms should transfer the load to case body members. Fabrication method shall be:

2.11.1.2.3.1 Full Bound

Full bound, captured in grooves on cabinet sides, top, and bottom. Cabinet backs for floor standing cabinets shall be side bound, captured in grooves; glued and fastened to top and bottom.

2.11.1.2.4 Cabinet Backs (Floor Standing Cabinets)

2.11.1.2.4.1 Side Bound

Side bound, captured in grooves; glued and fastened to top and bottom.

2.11.1.2.5 Wall Anchor Strips

Wall Anchor Strips shall be required for all cabinets with backs less than 1/2 inch thick. Strips shall consist of minimum 1/2 inch thick lumber, minimum 2-1/2 inches width; securely attached to wall side of cabinet back - top and bottom for wall hung cabinets, top only for floor standing cabinets.

2.11.2 Cabinet Floor Base

Floor cabinets shall be mounted on a base constructed of nominal 2 inch thick lumber. Base assembly components shall be treated lumber. Finished height for each cabinet base shall be as indicated on the drawings. Bottom edge of the cabinet door or drawer face shall be flush with top of base as indicated on the drawings.

2.11.3 Cabinet Door and Drawer Fronts

Door and drawer fronts shall be fabricated from 3/4 inch medium density particleboard. All door and drawer front edges shall be surfaced with high pressure plastic laminate PVC edgebanding, color and pattern to match exterior face laminate as indicated on the drawings.
2.11.4 Drawer Assembly

2.11.4.1 Drawer Components

Drawer components shall consist of a removable drawer front, sides, backs, and bottom. Drawer components shall be constructed of the following materials and thicknesses:

2.11.4.1.1 Drawer Sides and Backs For Transparent Finish

1/2 inch thick solid hardwood lumber

2.11.4.1.2 Drawer Bottom

1/4 inch thick veneer core panel product for transparent finish

2.11.4.2 Drawer Assembly Joinery Method

a. Multiple dovetail (all corners) or French dovetail front/dadoed back, glued under pressure.

2.11.5 Shelving

2.11.5.1 General Requirements

Shelving shall be fabricated from 3/4 inch veneer core plywood. All shelving top and bottom surfaces shall be finished with thermoset decorative overlay (melamine). Shelf edges shall be finished in a PVC edgebanding.

2.11.5.2 Shelf Support System

The shelf support system shall be:

2.11.5.2.1 Recessed (Mortised) Metal Shelf Standards

Mortise standards flush with the finishes surface of the cabinet interior side walls, two per side. Position and space standards on the side walls to provide a stable shelf surface that eliminates tipping when shelf front is weighted. Install and adjust standards vertically to provide a level, stable shelf surface when clips are in place.

2.11.6 Laminate Clad Countertops

Construct laminate countertop substrate of 3/4 inch veneer core plywood. The substrate shall be moisture-resistant where countertops receive sinks, lavatories, or are subjected to liquids. All substrates shall have sink cutout edges sealed with appropriate sealant against moisture. No joints shall occur at any cutouts. A balanced backer sheet is required.

2.11.6.1 Edge Style

Front countertop edges shall be in shapes and to dimensions as shown on the drawings. The countertop edge material shall be:

2.11.6.1.1 Post Formed Plastic Laminate

Laminate edge shall be integral with countertop surface. Shape and profile shall be bullnose and to dimensions as indicated.
2.11.6.2 Laminate Clad Splashes

Countertop splash substrate shall be 3/4 inch veneer core plywood. Laminate clad backsplash shall be integral with countertop, coved to radius and to dimensions as indicated on the drawings. Side splashes shall be straight profile and provided loose, to be installed at the time of countertop installation. Back and side splash laminate pattern and color shall match the adjacent countertop laminate.

2.11.7 Laminate Application

Laminate application to substrates shall follow the recommended procedures and instructions of the laminate manufacturer and ANSI/NEMA LD 3, using tools and devices specifically designed for laminate fabrication and application. Provide a balanced backer sheet (Grade BK) wherever only one surface of the component substrate requires a plastic laminate finish. Apply required grade of laminate in full uninterrupted sheets consistent with manufactured sizes using one piece for full length only, using adhesives specified herein or as recommended by the manufacturer. Fit corners and joints hairline. All laminate edges shall be machined flush, filed, sanded, or buffed to remove machine marks and eased (sharp corners removed). Clean up at easing shall be such that no overlap of the member eased is visible. Fabrication shall conform to ANSI A161.2. Laminate types and grades for component surfaces shall be as follows unless otherwise indicated on the drawings:

2.11.7.1 Base/Wall Cabinet Case Body

a. Exterior (exposed) surfaces to include exposed and semi-exposed face frame surfaces: HPDL Grade VGS.

b. Interior (semi-exposed) surfaces to include interior back wall, bottom, and side walls: Thermoset Decorative Overlay (melamine).

2.11.7.2 Adjustable Shelving

2.11.7.2.1 Top and Bottom Surfaces

Thermoset Decorative Overlay (melamine)

2.11.7.2.2 All Edges

Thermoset Decorative Overlay (melamine)

2.11.7.3 Fixed Shelving

2.11.7.3.1 Top and Bottom Surfaces

Thermoset Decorative Overlay (melamine)

2.11.7.3.2 Exposed Edges

Thermoset Decorative Overlay (melamine)
2.11.7.4 Door, Drawer Fronts, Access Panels

2.11.7.4.1 Exterior (Exposed) and Interior (Semi-Exposed) Faces

HPDL Grade VGS

2.11.7.4.2 Edges

PVC edgebanding

2.11.7.5 Drawer Assembly

All interior and exterior surfaces: Thermoset Decorative Overlay (melamine).

2.11.7.6 Countertops and Splashes

All exposed and semi-exposed surfaces: HPDL Grade HGS

2.11.7.7 Tolerances

Flushness, flatness, and joint tolerances of laminated surfaces shall meet the AWI AWS custom grade requirements.

2.11.8 Finishing

2.11.8.1 Filling

No fasteners shall be exposed on laminated surfaces. All nails, screws, and other fasteners in non-laminated cabinet components shall be countersunk and the holes filled with wood filler consistent in color with the wood species.

2.11.8.2 Sanding

All surfaces requiring coatings shall be prepared by sanding with a grit and in a manner that scratches will not show in the final system.

2.11.8.3 Coatings

Types, method of application and location of casework finishes shall be in accordance with the finish schedule, drawings and Section 09 90 00 PAINTS AND COATINGS. All cabinet reveals shall be painted. Submit descriptive data which provides narrative written verification of all types of construction materials and finishes, methods of construction, etc. not clearly illustrated on the submitted shop drawings. Data shall provide written verification of conformance with AWI AWS for the quality indicated to include materials, tolerances, and types of construction. Both the manufacturer of materials and the fabricator shall submit available literature which describes re-cycled product content, operations and processes in place that support efficient use of natural resources, energy efficiency, emissions of ozone depleting chemicals, management of water and operational waste, indoor environmental quality, and other production techniques supporting sustainable design and products.

PART 3 EXECUTION

3.1 INSTALLATION

Installation shall comply with applicable requirements for AWI AWS custom
quality standards. Countertops and fabricated assemblies shall be installed level, plumb, and true to line, in locations shown on the drawings. Cabinets and other laminate clad casework assemblies shall be attached and anchored securely to the floor and walls with mechanical fasteners that are appropriate for the wall and floor construction.

3.1.1 Anchoring Systems

3.1.1.1 Floor

Base cabinets shall utilize a floor anchoring system as detailed on the drawings. Anchoring and mechanical fasteners shall not be visible from the finished side of the casework assembly. Cabinet assemblies shall be attached to anchored bases without visible fasteners as indicated in the drawings. Where assembly abuts a wall surface, anchoring shall include a minimum 1/2 inch thick lumber or panel product hanging strip, minimum 2-1/2 inch width; securely attached to the top of the wall side of the cabinet back.

3.1.1.2 Wall

Cabinet to be wall mounted shall utilize minimum 1/2 inch thick lumber or panel product hanging strips, minimum 2-1/2 inch width; securely attached to the wall side of the cabinet back, both top and bottom.

3.1.2 Countertops

Countertops shall be installed in locations as indicated on the drawings. Countertops shall be fastened to supporting casework structure with mechanical fasteners, hidden from view. All joints formed by the countertop or countertop splash and adjacent wall surfaces shall be filled with a clear silicone caulk. Back splashes shall be adhered to both the countertop surface perimeter and the adjacent wall surface with adhesives appropriate for the type of materials to be adhered. Joints between the countertop surface and splash shall be filled with clear silicone caulk in a smooth consistent concave bead. Bead size shall be the minimum necessary to fill the joint and any surrounding voids or cracks.

3.1.3 Hardware

Casework hardware shall be installed in types and locations as indicated on the drawings. Where fully concealed European-style hinges are specified to be used with particleboard or fiberboard doors, the use of plastic or synthetic insertion dowels shall be used to receive 3/16 inch "Euroscrews". The use of wood screws without insertion dowels is prohibited.

3.1.4 Doors, Drawers and Removable Panels

The fitting of doors, drawers and removable panels shall be accomplished within target fitting tolerances for gaps and flushness in accordance with AWI AWS custom grade requirements.

3.1.5 Plumbing Fixtures

Install sinks, sink hardware, and other plumbing fixtures in locations as indicated on the drawings and in accordance with Section 22 00 00 PLUMBING, GENERAL PURPOSE.
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 D2583 (2013a) Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor


CSA GROUP (CSA)


NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

ANSI/NEMA LD 3 (2005) Standard for High-Pressure Decorative Laminates

NSF INTERNATIONAL (NSF)

NSF/ANSI 51 (2012) Food Equipment Materials
1.2 SYSTEM DESCRIPTION

a. Work under this section includes countertops and other items utilizing solid polymer (solid surfacing) fabrication as shown on the drawings and as described in this specification. Do not change source of supply for materials after work has started, if the appearance of finished work would be affected.

b. In most instances, installation of solid polymer fabricated components and assemblies will require strong, correctly located structural support provided by other trades. To provide a stable, sound, secure installation, close coordination is required between the solid polymer fabricator/installer and other trades to ensure that necessary structural wall support, cabinet counter top structural support, proper clearances, and other supporting components are provided for the installation of countertops and all other solid polymer fabrications to the degree and extent recommended by the solid polymer manufacturer.

c. Appropriate staging areas for solid polymer fabrications. Allow variation in component size and location of openings of plus or minus 1/8 inch.

1.3 SUSTAINABILITY REPORTING

Materials in this technical specification may contribute towards contract compliance with sustainability requirements. See Section 01 33 29 SUSTAINABILITY REPORTING for project requirements.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are forArchitect's approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings
   Detail Drawings; G
   Installation; G

SD-03 Product Data
   Solid Polymer Material
1.5 QUALITY ASSURANCE

1.5.1 Qualifications

To ensure warranty coverage, solid polymer fabricators shall be certified to fabricate by the solid polymer material manufacturer being utilized. Mark all fabrications with the fabricator's certification label affixed in an inconspicuous location. Fabricators shall have a minimum of 5 years of experience working with solid polymer materials. Submit solid polymer manufacturer's certification attesting to fabricator qualification approval.

1.5.2 Mock-ups

Submit Detail Drawings indicating locations, dimensions, component sizes, fabrication and joint details, attachment provisions, installation details, and coordination requirements with adjacent work. Prior to final approval of shop drawings, provide a full-size mock-up of a typical vanity top, countertop, where multiple units are required. The mock-up shall include all solid polymer components required to provide a completed unit. The mock-up shall utilize finishes in patterns and colors indicated on the drawings. Should the mock-up not be approved, re-work or remake it until approval is secured. Remove rejected units from the jobsite. Approved mock-up may remain as part of the finished work.

1.5.3 Sustainable Design Certification

Product shall be third party certified in accordance with ULE Greenguard Gold, SCS Scientific Certification Systems Indoor Advantage Gold or equal. VOC content and emissions shall be determined by ASTM D5116. Certification shall be performed annually and shall be current.

1.6 DELIVERY, STORAGE, AND HANDLING

Do not deliver materials to project site until areas are ready for
installation. Deliver components and materials to the site undamaged, in containers clearly marked and labeled with manufacturer's name. Materials shall be stored indoors and adequate precautions taken to prevent damage to finished surfaces. Provide protective coverings to prevent physical damage or staining following installation, for duration of project.

1.7 WARRANTY

Provide manufacturer's warranty of ten years against defects in materials, excluding damages caused by physical or chemical abuse or excessive heat. Warranty shall provide for material and labor for replacement or repair of defective material for a period of ten years after component installation.

PART 2 PRODUCTS

2.1 MATERIAL

Provide solid polymer material that is a homogeneous filled solid polymer; not coated, laminated or of a composite construction; meeting CSA B45.5-11/IAPMO Z124 requirements. Material shall have minimum physical and performance properties specified. Superficial damage to a depth of 0.01 inch shall be repairable by sanding or polishing. Material thickness shall be as indicated on the drawings. In no case shall material be less than 1/4 inch in thickness. Submit a minimum 4 by 4 inch sample of each color and pattern for approval. Samples shall indicate full range of color and pattern variation. Approved samples shall be retained as a standard for this work. Submit test report results from an independent testing laboratory attesting that the submitted solid polymer material meets or exceeds each of the specified performance requirements.

2.1.1 Cast, 100 Percent Acrylic Polymer Solid Surfacing Material

Cast, 100 percent acrylic solid polymer material shall be composed of acrylic polymer, mineral fillers, and pigments and shall meet the following minimum performance requirements:

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>REQUIREMENT (min. or max.)</th>
<th>TEST PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength</td>
<td>4000 psi (max.)</td>
<td>ASTM D638</td>
</tr>
<tr>
<td>Hardness</td>
<td>55-Barcol Impessor (min.)</td>
<td>ASTM D2583</td>
</tr>
<tr>
<td>Thermal Expansion</td>
<td>.000023 in/in/F (max.)</td>
<td>ASTM D696</td>
</tr>
<tr>
<td>Boiling Water Surface Resistance</td>
<td>No Change</td>
<td>ANSI/NEMA LD 3-3.05</td>
</tr>
<tr>
<td>High Temperature Resistance</td>
<td>No Change</td>
<td>ANSI/NEMA LD 3-3.06</td>
</tr>
<tr>
<td>Impact Resistance (Ball drop)</td>
<td>1/4 inch sheet</td>
<td>ANSI/NEMA LD 3-303</td>
</tr>
<tr>
<td></td>
<td>36 inches, 1/2 lb ball, no failure</td>
<td></td>
</tr>
<tr>
<td>PROPERTY</td>
<td>REQUIREMENT</td>
<td>TEST PROCEDURE</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>1/2 inch sheet</td>
<td>140 inches, 1/2 lb ball, no failure</td>
<td></td>
</tr>
<tr>
<td>3/4 inch sheet</td>
<td>200 inches, 1/2 lb ball, no failure</td>
<td></td>
</tr>
<tr>
<td>Mold &amp; Mildew Growth</td>
<td>No growth</td>
<td>ASTM G21</td>
</tr>
<tr>
<td>Bacteria Growth</td>
<td>No growth</td>
<td>ASTM G21</td>
</tr>
<tr>
<td>Liquid Absorption (Weight in 24 hrs.)</td>
<td>0.1 percent max.</td>
<td>ASTM D570</td>
</tr>
<tr>
<td>Flammability</td>
<td></td>
<td>ASTM E84</td>
</tr>
<tr>
<td>Flame Spread</td>
<td>25 max.</td>
<td></td>
</tr>
<tr>
<td>Smoke Developed</td>
<td>30 max.</td>
<td></td>
</tr>
<tr>
<td>Sanitation</td>
<td>&quot;Food Contact&quot; approval</td>
<td>NSF/ANSI 51</td>
</tr>
</tbody>
</table>

2.1.2 Acrylic-modified Polymer Solid Surfacing Material

Cast, solid polymer material shall be composed of a formulation containing acrylic and polyester polymers, mineral fillers, and pigments. Acrylic polymer content shall be not less than 5 percent and not more than 10 percent in order to meet the following minimum performance requirements:

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>REQUIREMENT</th>
<th>TEST PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength</td>
<td>4100 psi (max.)</td>
<td>ASTM D638</td>
</tr>
<tr>
<td>Hardness</td>
<td>50-Barcol Impressor (min.)</td>
<td>ASTM D2583</td>
</tr>
<tr>
<td>Thermal Expansion</td>
<td>.000023 in/in/F (max.)</td>
<td>ASTM D696</td>
</tr>
<tr>
<td>Boiling Water Surface Resistance</td>
<td>No Change</td>
<td>ANSI/NEMA LD 3-3.05</td>
</tr>
<tr>
<td>High Temperature Resistance</td>
<td>No Change</td>
<td>ANSI/NEMA LD 3-3.06</td>
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</tr>
<tr>
<td>1/4 inch sheet</td>
<td>36 inches, 1/2 lb ball, no failure</td>
<td></td>
</tr>
<tr>
<td>1/2 inch sheet</td>
<td>140 inches, 1/2 lb ball, no failure</td>
<td></td>
</tr>
</tbody>
</table>
### PROPERTY REQUIREMENT TEST PROCEDURE

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>REQUIREMENT (min. or max.)</th>
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<td>3/4 inch sheet</td>
<td>200 inches, 1/2 lb ball, no failure</td>
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<tr>
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<td>No growth</td>
<td>ASTM G21</td>
</tr>
<tr>
<td>Bacteria Growth</td>
<td>No growth</td>
<td>ASTM G21</td>
</tr>
<tr>
<td>Liquid Absorption (Weight in 24 hrs.)</td>
<td>0.6 percent max.</td>
<td>ASTM D570</td>
</tr>
<tr>
<td>Flammability</td>
<td></td>
<td>ASTM E84</td>
</tr>
<tr>
<td>Flame Spread</td>
<td>25 max.</td>
<td></td>
</tr>
<tr>
<td>Smoke Developed</td>
<td>100 max.</td>
<td></td>
</tr>
<tr>
<td>Sanitation</td>
<td>&quot;Food Contact&quot; approval</td>
<td>NSF/ANSI 51</td>
</tr>
</tbody>
</table>

#### 2.1.3 Material Patterns and Colors

Patterns and colors for all solid polymer components and fabrications shall be those indicated; on the project drawings. Pattern and color shall occur, and shall be consistent in appearance, throughout the entire depth (thickness) of the solid polymer material.

#### 2.1.4 Surface Finish

Exposed finished surfaces and edges shall receive a uniform appearance. Exposed surface finish shall be matte; gloss rating of 5-20; refer to drawings.

#### 2.2 ACCESSORY PRODUCTS

Accessory products, as specified below, shall be manufactured by the solid polymer manufacturer or shall be products approved by the solid polymer manufacturer for use with the solid polymer materials being specified.

#### 2.2.1 Seam Adhesive

Seam adhesive shall be a two-part adhesive kit to create permanent, inconspicuous, non-porous, hard seams and joints by chemical bond between solid polymer materials and components to create a monolithic appearance of the fabrication. Adhesive shall be approved by the solid polymer manufacturer. Adhesive shall be color-matched to the surfaces being bonded where solid-colored, solid polymer materials are being bonded together. The seam adhesive shall be clear or color matched where particulate patterned, solid polymer materials are being bonded together.
2.2.2 Panel Adhesive

Panel adhesive shall be neoprene based panel adhesive meeting TCNA Hdbk, Underwriter's Laboratories (UL) listed. Use this adhesive to bond solid polymer components to adjacent and underlying substrates.

2.2.3 Silicone Sealant

Sealant shall be a mildew-resistant, FDA and OSHA Nationally Recognized Testing Laboratory (NRTL) listed silicone sealant or caulk in a clear formulation. The silicone sealant shall be approved for use by the solid polymer manufacturer. Use sealant to seal all expansion joints between solid polymer components and all joints between solid polymer components and other adjacent surfaces such as walls, floors, ceiling, and plumbing fixtures.

2.2.4 Mounting Hardware

Provide mounting hardware, including sink/bowl clips, inserts and fasteners for attachment of undermount sinks and lavatories.

2.3 FABRICATIONS

Components shall be factory or shop fabricated to sizes and shapes indicated, to the greatest extent practical, in accordance with approved Shop Drawings and manufacturer's requirements. Provide factory cutouts for sinks, lavatories, and plumbing fixtures where indicated on the drawings. Contours and radii shall be routed to template, with edges smooth. Defective and inaccurate work will be rejected. Submit product data indicating product description, fabrication information, and compliance with specified performance requirements for solid polymer, joint adhesive, sealants, and heat reflective tape. Both the manufacturer of materials and the fabricator shall submit a detailed description of operations and processes in place that support efficient use of natural resources, energy efficiency, emissions of ozone depleting chemicals, management of water and operational waste, indoor environmental quality, and other production techniques supporting sustainable design and products.

2.3.1 Joints and Seams

Form joints and seams between solid polymer components using manufacturer's approved seam adhesive. Joints shall be inconspicuous in appearance and without voids to create a monolithic appearance.

2.3.2 Edge Finishing

Rout and finish component edges to a smooth, uniform appearance and finish. Edge shapes and treatments, including any inserts, shall be as detailed on the drawings. Rout all cutouts, then sand all edges smooth. Repair or reject defective or inaccurate work.

2.3.3 Counter and Vanity Top Splashes

Fabricate backsplashes and end splashes from 1/2 inch thick solid surfacing material to be 4 inches high in conformance with dimensions and shapes as indicated on the drawings. Backsplashes and end splashes shall be provided at locations indicated on the drawings. Backsplashes shall be shop fabricated and be permanently attached.
2.3.3.1 Permanently Attached Backsplash

Permanently attached backsplashes shall be attached straight with seam adhesive to form a 90 degree transition.

2.3.3.2 End Splashes

End splashes shall be provided loose for installation at the jobsite after horizontal surfaces to which they are to be attached have been installed.

2.3.4 Counter and Vanity Tops

Fabricate all solid surfacing, solid polymer counter top and vanity top components from 1/2 inch thick material. Edge details, dimensions, locations, and quantities shall be as indicated on the Drawings. Counter tops shall be complete with 4 inch high permanently attached, 90 degree transition where indicated on the drawings. Attach 2 inch wide reinforcing strip of polymer material under each horizontal counter top seam. Submit a minimum 1 foot wide by 6 inch deep, full size sample for each type of counter top shown on the project drawings. The sample shall include the edge profile and backsplash as detailed on the project drawings. Solid polymer material shall be of a pattern and color as indicated on the drawings. Sample shall include at least one seam. Approved sample shall be retained as standard for this work.

2.3.4.1 Counter Top With Sink

a. Stainless Steel Sink. Countertops with sinks shall include cutouts to template as furnished by the sink manufacturer. Manufacturer's standard sink mounting hardware for rimless installation shall be provided. Seam between sink and counter top shall be sealed with silicone sealant. Sink, faucet, and plumbing requirements shall be in accordance with Section 22 00 00 PLUMBING, GENERAL PURPOSE.

b. Solid polymer sinks shall be a manufacturer's standard, pre-molded product specifically designed for attachment to solid polymer counter tops.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Components

Install all components and fabricated units plumb, level, and rigid. Make field joints between solid polymer components using solid polymer manufacturer's approved seam adhesives, to provide a monolithic appearance with joints inconspicuous in the finished work. Attach metal or vitreous china sinks and lavatory bowls to counter tops using solid polymer manufacturer's recommended clear silicone sealant and mounting hardware. Solid polymer sinks and bowls shall be installed using a color-matched seam adhesive. Plumbing connections to sinks and lavatories shall be made in accordance with Section 22 00 00 PLUMBING, GENERAL PURPOSE.

3.1.2 Silicone Sealant

Use a clear, silicone sealant or caulk to seal all expansion joints between solid polymer components and all joints between solid polymer components and other adjacent surfaces such as walls, floors, ceiling, and plumbing.
fixtures. Sealant bead shall be smooth and uniform in appearance and shall be the minimum size necessary to bridge any gaps between the solid surfacing material and the adjacent surface. Bead shall be continuous and run the entire length of the joint being sealed.

3.1.3 Plumbing

Make plumbing connections to sinks and lavatories in accordance with Section 22 00 00 PLUMBING, GENERAL PURPOSE.

3.2 CLEAN-UP

Components shall be cleaned after installation and covered to protect against damage during completion of the remaining project items. Components damaged after installation by other trades will be repaired or replaced at the General Contractor's cost. Component supplier will provide a repair/replace cost estimate to the General Contractor who shall approve estimate before repairs are made. Submit a minimum of six copies of maintenance data indicating manufacturer's care, repair and cleaning instructions. Maintenance video shall be provided, if available. Maintenance kit for matte finishes shall be submitted.

-- End of Section --
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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 D1557 (2012; E 2015) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2700 kN-m/m³)


1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data
- Bentonite Materials; G
- Bentonite Panels; G
- Accessories; G

SD-08 Manufacturer's Instructions
- Application
- Protection
- Corrections Procedures; G

1.3 DELIVERY, STORAGE, AND HANDLING

Deliver, store, and handle bentonite waterproofing materials in original manufacturer's packaging and in strict accordance with manufacturer's printed instructions. Do not place or store bentonite materials in wet areas or during precipitation. Protect materials and accessories from moisture. Remove and replace products that show evidence of exposure to moisture prior to completion of installation. Remove materials which show evidence of damage, deterioration, or contamination.

Provide bentonite products and containers with manufacturer's labels intact.
and identifying all materials.

PART 2 PRODUCTS

2.1 BENTONITE MATERIALS

2.1.1 Bulk Bentonite

Provide high swelling, sodium bentonite containing a minimum of 90 percent montmorillonite and a maximum of 10 percent unaltered volcanic ash or other native sediments.

2.1.2 Bentonite Properties

Provide material meeting the following requirements:

2.1.2.1 Free Swell Rating

Two grams of granular bentonite sifted into deionized water must swell to occupy a minimum volume of 16 cubic centimeters.

2.1.2.2 Active Ingredient

Hydrous silicate of alumina, composed of the following chemical percentages and their allowable deviations:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silica</td>
<td>61.0 plus/minus 3.0</td>
</tr>
<tr>
<td>Alumina</td>
<td>19.5 plus/minus 1.5</td>
</tr>
<tr>
<td>Iron oxide</td>
<td>5.0 plus/minus 1.0</td>
</tr>
<tr>
<td>Magnesia</td>
<td>2.8 plus/minus 0.4</td>
</tr>
<tr>
<td>Soda and potash oxides</td>
<td>2.4 plus/minus 0.7</td>
</tr>
<tr>
<td>Calcium oxide</td>
<td>0.6 plus/minus 0.5</td>
</tr>
<tr>
<td>Molecular water</td>
<td>6.1 plus/minus 0.6</td>
</tr>
<tr>
<td>Minor</td>
<td>2.6 plus/minus 0.6</td>
</tr>
</tbody>
</table>

2.1.3 Bentonite Panels

Provide panels containing bentonite material sealed between two layers of absorbent material with a minimum of 1 pound of evenly distributed bentonite per square foot. Provide bentonite panels with a minimum thickness of 48 inches square by minimum dry thickness of 3/16 inch.

2.1.4 Bentonite Mineral Based Gel

Provide material in accordance with ASTM D217 for a worked penetration range of 215 to 275. Provide gel with a minimum of 45 percent controlled, partially hydrated, high swelling sodium bentonite by weight with a minimum pH of 8.8, no free water, and 25 percent or more residual swell.
PART 3 EXECUTION

3.1 SURFACE PREPARATION

Examine surfaces prior to treatment, eliminate irregularities and remove loose and foreign material. Point cracks and honeycombs in concrete surfaces. Make surfaces of finished patches flush with adjacent concrete surfaces.

3.2 APPLICATION

Apply bentonite waterproofing on exterior surfaces of below grade concrete walls and wall footings where indicated, in accordance with manufacturer's printed instructions. Securely fasten panels over all construction joints and all expansion joints. Thoroughly pack all through-wall openings and penetrations with bentonite gel, granular bentonite, or both, prior to placement of bentonite panels.

3.3 PROTECTION

Protect bentonite panels during backfilling and compaction in accordance with manufacturer's printed instructions. If backfill is not immediately applied, protect panels from precipitation by completely covering exposed panels with polyethylene; remove polyethylene immediately prior to backfilling. Replace damaged panels with new panels before and during backfilling and compaction.

3.4 BACKFILL

Backfill with smooth and uniform material with no sharp projections. Compact backfill to at least 85 percent of ASTM D1557 maximum density. Ensure backfill material is not contaminated with salt or other materials that could prevent bentonite from hydrating.

3.5 CORRECTIONS

Repair leaks and defective areas in accordance with manufacturer's printed instructions.

-- End of Section --
This page was intentionally left blank for duplex printing.
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 ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)


AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO T 259 (2002; R 2017) Standard Method of Test for Resistance of Concrete to Chloride Ion Penetration

AASHTO T 260 (1997; R 2016) Standard Method of Test for Sampling and Testing for Chloride Ion in Concrete and Concrete Raw Materials

ASTM INTERNATIONAL (ASTM)

ASTM C140/C140M (2017a) Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units

ASTM C672/C672M (2012) Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals

ASTM D2369 (2010; R 2015; E 2015) Volatile Content of Coatings

ASTM D3278 (1996; R 2011) Flash Point of Liquids by Small Scale Closed-Cup Apparatus


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

29 CFR 1910.1000 Air Contaminants
1.2 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. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data
  Water Repellents
SD-06 Test Reports
  Water Absorption
  Accelerated Weathering
  Resistance to Chloride Ion Penetration
  Moisture Vapor Transmission
  Scaling Resistance
  Water Penetration and Leakage
SD-07 Certificates
  Manufacturer's Qualifications
  Applicator's Qualifications
  Evidence of Acceptable Variation
  Warranty
SD-08 Manufacturer's Instructions
  Application Instructions
  Provide manufacturer's instructions including preparation, application, recommended equipment to be used, safety measures, and protection of completed application.
  Manufacturer's Safety Data Sheets

1.3 QUALITY ASSURANCE

1.3.1 Qualifications

a. Manufacturer's qualifications: Minimum five years record of successful in-service experience of water repellent treatments manufactured for unit masonry and plaster application.

b. Applicator's qualifications: Minimum five years successful experience in projects of similar scope using specified or similar treatment
1.3.2 Performance Requirements

a. Water absorption: ASTM C140/C140M. Comparison of treated and untreated specimens.

b. Moisture vapor transmission: ASTM E96/E96M. Comparison of treated and untreated specimens.

c. Water penetration and leakage through masonry: ASTM E514/E514M.

1.3.3 Evidence of Acceptable Variation

If a product proposed for use does not conform to requirements of the referenced specification, submit for approval to the Contracting Officer, evidence that the proposed product is either equal to or better than the product specified. Include the following:

a. Identification of the proposed substitution;

b. Reason why the substitution is necessary;

c. A comparative analysis of the specified product and the proposed substitution, including tabulations of the composition of pigment and vehicle;

d. The difference between the specified product and the proposed substitution; and

e. Other information necessary for an accurate comparison of the proposed substitution and the specified product.

1.4 SAMPLE TEST PANEL

The approved Sample Test Panel will serve as the standard of quality for all other water repellent coating work. Do not proceed with application until the sample panel has been approved by the Contracting Officer.

1.4.1 Sample Test Panel

Prior to commencing work, including bulk purchase and delivery of material, apply water repellent treatment to a minimum 4 feet high by 4 feet long unit masonry and plaster test-panel. Provide a full height expansion joint at mid-panel length. Prepare and seal joint with materials approved for project use.

1.4.1.1 Testing

AAMA 501.1 Provide field water testing of water repellent treated surfaces in the presence of the Contracting Officer and the water repellent treatment manufacturer's representative.

a. Apply water repellent to left side of mock-up and allow to cure prior to application of treatment to right side.

b. Twenty days after completion of application of treatment, test mock-up with 5/8 inch garden hose, with spray nozzle, located 10 feet from wall and aimed upward so water strikes wall at 45 degree downward angle.
After water has run continuously for three hours observe back side of mock-up for water penetration and leakage. If leakage is detected make changes as needed and retest.

c. Coordinate testing procedures and modify project treatment application as required to pass mock-up tests for water penetration and leakage resistance.

1.4.1.2 Approval

Proceed with water repellent treatment work only after completion of field test application and approval of mock-up and tests by the Contracting Officer.

1.4.2 Pre-Installation Meeting

a. Attend pre-installation meeting required prior to commencement of unit masonry and plaster installation.

b. Review procedures and coordination required between water repellent treatment work and work of other trades which could affect work to be performed under this section of the work.

c. Convene additional pre-installation meeting prior to water repellent treatment application for coordination with work not previously coordinated including joint sealants.

1.5 REGULATORY REQUIREMENTS

1.5.1 Environmental Protection

In addition to requirements specified in Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS for environmental protection, provide coating materials that conform to the restrictions of the Local Air Pollution Control jurisdiction. Notify the Contracting Officer of any water repellent coating specified herein which fails to conform to the local Air Quality Management District Rules at the location of the Project. In localities where the specified coating is prohibited, the Contracting Officer may direct the substitution of an acceptable coating.

1.6 DELIVERY, STORAGE, AND HANDLING

Deliver materials in original sealed containers, clearly marked with the manufacturer's name, brand name, type of material, batch number, percent solids by weight and volume, and date of manufacturer. Store materials off the ground, in a dry area where the temperature will be not less than 50 degrees F nor more than 85 degrees F.

1.7 SAFETY METHODS

Apply coating materials using safety methods and equipment in accordance with Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS, and the following:

1.7.1 Toxic Materials

To protect personnel from overexposure to toxic materials, conform to the most stringent guidance of:

a. The coating manufacturer when using solvents or other chemicals. Use
impermeable gloves, chemical goggles or face shield, and other recommended protective clothing and equipment to avoid exposure of skin, eyes, and respiratory system. Conduct work in a manner to minimize exposure of building occupants and the general public.

b. 29 CFR 1910.1000.

c. Threshold Limit Values (R) of the American Conference of Governmental Industrial Hygienists.

d. Manufacturer's Safety Data Sheets.

1.8 ENVIRONMENTAL CONDITIONS

1.8.1 Weather and Substrate Conditions

Do not proceed with application of water repellents under any of the following conditions, except with written recommendations of manufacturer.

a. Ambient temperature is less than 40 degrees F.

b. Substrate faces have cured less than one month.

c. Rain or temperature below 40 degrees F are predicted for a period of 24 hours before or after treatment.

d. Earlier than three days after surfaces are wet.

e. Substrate is frozen or surface temperature is less than 40 degrees F and falling.

1.8.2 Moisture Condition

Determine moisture content of substrate meets manufacturer's requirements prior to application of water repellent material.

1.9 SEQUENCING AND SCHEDULING

1.9.1 Masonry Surfaces

Do not start water repellent coating until all joint tooling, pointing and masonry cleaning operations have been completed. Allow masonry to cure for at least 60 days under normal weather conditions before applying water repellent.

1.9.2 Plaster Surfaces

Do not start water repellent coating until all shrinkage and stress cracks are repaired and sound, all surfaces are free of defects and cleaning operations have been completed. Allow plaster to cure for at least 30 days under normal weather conditions before applying water repellent.

1.9.3 Sealants

Do not apply water repellents until the sealants for joints adjacent to surfaces receiving water repellent treatment have been installed and cured.

a. Water repellent work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using
substrate, water repellent, and sealant materials identical to those used in the work.

b. Provide manufacturers' test results of compatibility.

1.10 INSPECTIONS

Notify the manufacturer's representative a minimum of 72 hours prior to scheduled application of water repellents for field inspection. Inspect surfaces and obtain approval in writing from the manufacturer's representative prior to any application of any water repellent coating.

1.11 SURFACES TO BE COATED

Coat all exterior unit masonry and plaster surfaces indicated to receive water repellent coating. This includes top of walls, edges and returns adjacent to windows and door frames and free standing walls.

1.12 WARRANTY

Provide a warranty, issued jointly by the manufacturer and the applicator of the water repellent treatment against moisture penetration through the treated structurally sound surface for a period of five years. Warranty to provide the material, labor, and equipment necessary to remedy the problem. At the satisfactory completion of the work, complete the warranty sign, notarize, and submit to the Contracting Officer.

PART 2 PRODUCTS

2.1 MATERIALS

Water repellent solution shall be a clear, non-yellowing, deep-penetrating, VOC compliant solution. Material shall not stain or discolor and shall produce a mechanical and chemical interlocking bond with the substrate to the depth of the penetration.

2.2 WATER REPELLENTS

2.2.1 Siloxanes

Penetrating water repellent. Alkylalkoxysiloxanes that are oligomeric with alcohol, ethanol, mineral spirits, or water.

a. Solids by weight: ASTM D2369, 7.5 to 16.0 percent.

b. Volatile Organic Content (VOC) after blending: Less than 175 grams per liter.

c. Density, activated: 8.4 pounds per gallon, plus or minus one percent.

d. Flash point, ASTM D3278: Greater than 212 degrees F.

2.2.2 VOC-Complying Water Repellents

Products certified by the manufacturer that they comply with local regulations controlling use of volatile organic compounds (VOC's).
2.3 PERFORMANCE CRITERIA

2.3.1 Siloxanes

a. Dry time for recoat, if necessary: One to two hours depending on weather conditions.

b. Penetration: 3/8 inch, depending on substrate.

c. Water penetration and leakage through masonry, ASTM E514/E514M, percentage reduction of leakage: 97.0 percent minimum.

d. Moisture vapor transmission, ASTM E96/E96M: 47.5 perms or 82 percent maximum compared to untreated sample.


f. Resistance to chloride ion penetration, AASHTO T 259 and AASHTO T 260.

g. Scaling resistance, ASTM C672/C672M, non-air-entrained concrete: Zero rating, no scaling, 100 cycles treated concrete.

PART 3 EXECUTION

3.1 EXAMINATION

Examine unit masonry and plaster surfaces to be treated to ensure that:

a. All visible cracks, voids or holes have been repaired.

b. All mortar joints in masonry are tight and sound, have not been re-set or misaligned and show no cracks or spalling.

c. Moisture contents of walls does not exceed 15 percent when measured on an electronic moisture register, calibrated for the appropriate substrate.

d. Concrete surfaces are free of form release agents, curing compounds and other compounds that would prevent full penetration of the water repellent material.

Do not start water repellent treatment work until all deficiencies have been corrected, examined and found acceptable to the Contracting Officer and the water repellent treatment manufacturer. Do not apply treatment to damp, dirty, dusty or otherwise unsuitable surfaces. Comply with the manufacturer's recommendations for suitability of surface.

3.2 PREPARATION

3.2.1 Surface Preparation

Prepare substrates in accordance with water repellent treatment manufacturer's recommendation. Clean surfaces of dust, dirt, efflorescence, alkaline, and foreign matter detrimental to proper application of water repellent treatment.
3.2.2 Protection

Provide masking or protective covering for materials which could be damaged by water repellent treatment.

a. Protect glass, glazed products, and prefinished products from contact with water repellent treatment.

b. Protect landscape materials with breathing type drop cloths; plastic covers are not acceptable.

3.2.3 Compatibility

a. Confirm treatment compatibility with each type of joint sealer within or adjacent to surfaces receiving water repellent treatment in accordance with manufacturer's recommendations.

3.3 MIXING

Mix water repellent material thoroughly in accordance with the manufacturer's recommendations. Mix, in quantities required for that day's work, all containers prior to application. Mix each container the same length of time.

3.4 APPLICATION

In strict accordance with the manufacturer's written requirements. Do not start application without the manufacturer's representative being present or his written acceptance of the surface to be treated.

3.4.1 Water Repellent Treatment

3.4.1.1 Spray Application

Spray apply water repellent material to exterior unit masonry and plaster surfaces using low-pressure airless spray equipment in strict accordance with manufacturer's printed application, instructions, and precautions. Maintain copies at the job site. Apply flood coat in an overlapping pattern allowing approximately 8 to 10 inch rundown on the vertical surface. Maintain a wet edge at all overlaps, both vertical and horizontal. Hold gun maximum 18 inches from wall.

3.4.1.2 Brush or Roller Application

Brush or roller apply water repellent material only at locations where overspray would affect adjacent materials and where not practical for spray applications.

3.4.1.3 Covered Surfaces

Coat all exterior unit masonry and plaster surfaces including tops of walls, edges and returns adjacent to window and door frames, window sills, and free-standing walls.

3.4.1.4 Rate of Application

Apply materials to exterior surfaces at the coverages recommended by the manufacturer and as determined from sample panel test. Increase or decrease application rates depending upon the surface texture and porosity of the
substrate so as to achieve even appearance and total water repellency.

3.4.1.5 Number of Coats

The sample panel test shall determine the number of coats required to achieve full coverage and protection.

3.4.1.6 Appearance

If unevenness in appearance, lines of work termination or scaffold lines exist, or detectable changes from the approved sample panel occur, the Contracting Officer may require additional treatment at no additional cost to the Government. Apply any required additional treatment to a natural break off point.

3.5 CLEANING

Clean all runs, drips, and overspray from adjacent surfaces while the water repellent treatment is still wet in a manner recommended by the manufacturer.

3.6 FIELD QUALITY CONTROL

Do not remove drums containing water repellent material from the job site until completion of all water repellent treatment and until so authorized by the Contracting Officer.

3.6.1 Field Testing

AAMA 501.1. At a time not less than twenty days after completion of the water repellent coating application, subject a representative wall area of the building to the Navy Hose Stream Field Test similar to AAMA 501.1 hose test to simulated rainfall for a period of three hours. Use a minimum 5/8 inch diameter hose and a fixed lawn sprinkler spray head which will direct a full flow of water against the wall. Place the sprinkler head so that the water will strike the wall downward at a 45 degree angle to the wall. If the inside of the wall shows any trace of moisture during or following the test, apply another coat of water repellent, at the manufacturer's recommended coverage rate to the entire building. Repeat testing and re-coating process until no moisture shows on the inside wall face. Accomplish any required work retesting and re-coating at no additional cost to the Government.

3.6.2 Site Inspection

Inspect treatment in progress by manufacturer's representative to verify compliance with manufacturer instructions and recommendations.

-- End of Section --
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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)


INTERNATIONAL CODE COUNCIL (ICC)


SCIENTIFIC CERTIFICATION SYSTEMS (SCS)

SCS SCS Global Services (SCS) Indoor Advantage

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

29 CFR 1910.134 Respiratory Protection

UL ENVIRONMENT (ULE)

ULE Greenguard UL Greenguard Certification Program

1.2  SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Manufacturer's Standard Details

Board Insulation

Accessories including sealants
SD-07 Certificates
Board Insulation
Draft Special Warranties
Final Special Warranties

SD-08 Manufacturer's Instructions
Board Insulation
Adhesive

SD-11 Closeout Submittals
ULE Greenguard; S
Volatile Organic Compound (VOC) Content; S
Recycled Content; S

1.3 MANUFACTURER'S DETAILS

Submit manufacturer's standard details indicating methods of attachment and spacing, transition and termination details, and installation details. Include verification of existing conditions.

1.4 PRODUCT DATA

Include data for material descriptions, recommendations for product shelf life, and precautions for flammability and toxicity. Include data to verify compatibility of sealants with insulation.

1.5 CERTIFICATIONS

Provide products that are third party certified in accordance with ULE Greenguard Gold, SCS Scientific Certification Systems Indoor Advantage Gold or approved equal. (http://www.scsglobalservices.com/indoor-air-quality-certification)

1.6 DELIVERY, STORAGE, AND HANDLING

1.6.1 Delivery

Deliver materials to the site in original sealed wrapping bearing manufacturer's name and brand designation, specification number, type, grade, R-value, and class. Store and handle to protect from damage. Do not allow insulation materials to become wet, soiled, crushed, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storing, and protecting of materials before and during installation.

1.6.2 Storage

Inspect materials delivered to the site for damage and store out of weather in manufacturer's original packaging. Store only in dry locations, not subject to open flames or sparks, and easily accessible for inspection and handling. Keep materials wrapped and separated from off-gassing materials (such as drying paints and adhesives). Do not use materials that have
visible moisture or biological growth. Comply with manufacturer's recommendations for handling, storage, and protection of materials before and during installation.

1.7 SAFETY PRECAUTIONS

1.7.1 Respirators

Provide installers with dust/mist respirators, training in their use, and protective clothing, all approved by the National Institute for Occupational Safety and Health (NIOSH)/Mine Safety and Health Administration (MSHA) and in accordance with 29 CFR 1910.134.

1.7.2 Other Safety Considerations

Comply with the safety requirements of ASTM C930.

1.8 SPECIAL WARRANTIES

1.8.1 Guarantee

Guarantee insulation installation against failure due to ultraviolet light exposure for a period of three years from the date of Beneficial Occupancy.

1.8.2 Warranty

Provide manufacturer's material warranty for all system components for a period of three years from the date of Beneficial Occupancy.

PART 2 PRODUCTS

2.1 PRODUCT SUSTAINABILITY CRITERIA

Where allowed by performance criteria:

2.1.1 Reduced Volatile Organic Compound (VOC) Content

Provide products with reduced VOC content and provide documentation in accordance with Section 01 33 29 SUSTAINABILITY REPORTING paragraph REDUCE VOLATILE ORGANIC COMPOUNDS.

2.1.2 Recycled Content

Provide products with recycled content and provide documentation in accordance with Section 01 33 29 SUSTAINABILITY REPORTING paragraph RECYCLED CONTENT.

2.2 BOARD INSULATION

Provide thermal insulating materials as recommended by manufacturer for each type of application indicated. Provide insulation with the following physical properties and in accordance with the following standards:

a. Unfaced Preformed Rigid Polyisocyanurate Board: ASTM C591

2.2.1 Thermal Resistance

Unless otherwise indicated, Wall R-Value as indicated on drawings.
2.2.2 Fire Protection Requirements

a. Flame spread index of 75 or less when tested in accordance with ASTM E84.

b. Smoke developed index of 450 or less when tested in accordance with ASTM E84.

c. Provide insulated assemblies in accordance ICC IBC Chapter Fire and Smoke Protection Features.

2.2.3 Recycled Materials

Provide thermal insulation containing recycled materials to the extent practicable, provided that the material meets all other requirements of this section. The minimum required recycled material contents (by weight, not volume) are:

| Polyisocyanurate/Polyurethane: | 9 percent |

2.2.4 Prohibited Materials

Do not provide materials containing asbestos.

2.3 ACCESSORIES

2.3.1 Adhesive

As recommended by insulation manufacturer.

2.3.2 Mechanical Fasteners

Corrosion resistant fasteners as recommended by the insulation manufacturer.

PART 3 EXECUTION

3.1 EXISTING CONDITIONS

Prior to installation, ensure all areas that are in contact with the insulation are dry and free of projections that could cause voids, compressed insulation. Do not proceed with installation if moisture or other conditions are present, and notify the Contracting Officer of such conditions. Do not proceed with the work until conditions have been corrected and verified to be dry.

3.2 INSTALLATION

3.2.1 Installation and Handling

Provide insulation in accordance with the manufacturer's printed installation instructions. Keep material dry and free of extraneous materials.

3.2.2 Electrical Wiring

Do not install insulation in a manner that would enclose electrical wiring between two layers of insulation.
3.2.3 Continuity of Insulation

Butt tightly against adjoining boards, studs, and obstructions. Provide continuity and integrity of insulation at corners, wall to ceiling joint, and floor. Avoid creating thermal bridges and voids. Provide and verify continuity of insulative barrier throughout the building enclosure.

3.2.4 Coordination

Verify final installed insulation thicknesses comply with thicknesses indicated, R-values specified on drawings, and with the approved insulation submittals.

3.3 INSTALLATION ON WALLS

3.3.1 Installation using Furring Strips

Install insulation on members as recommended by insulation manufacturer.

3.3.2 Installation on Masonry Walls

Apply board directly to masonry with adhesive or fasteners as recommended by the insulation manufacturer. Fit between obstructions without impaling board on ties or anchors. Apply in parallel courses with joints breaking midway over course below. Place boards in moderate contact with adjoining insulation without forcing and without gaps. Cut and shape as required to fit around wall penetrations, projections or openings to accommodate conduit or other utilities. Seal around cutouts with sealant. Install insulation in wall cavities so that it leaves at least a nominal 1 inch air space outside of the insulation to allow for cavity drainage.

3.3.3 Adhesive Attachment to Concrete and Masonry Walls

Apply adhesive to wall and completely cover wall with insulation.

As recommended by the insulation manufacturer.

3.3.4 Mechanical Attachment on Concrete and Masonry Walls

Cut insulation to cover walls. Apply adhesive to wall and set clip or other mechanical fastener in adhesive as recommended by manufacturer. After curing of adhesive, install insulation over fasteners and bend split prongs to provide a flush condition with the insulation. Butt all edges of insulation and seal with tape.
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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 D3575 (2014) Flexible Cellular Materials Made From Olefin Polymers

ASTM E136 (2016) Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C


NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)


NFPA 70 (2017; ERTA 1-2 2017; TIA 17-1; TIA 17-2; TIA 17-3; TIA 17-4; TIA 17-5; TIA 17-6; TIA 17-7; TIA 17-8; TIA 17-9; TIA 17-10; TIA 17-11; TIA 17-12; TIA 17-13; TIA 17-14) National Electrical Code

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

29 CFR 1910.134 Respiratory Protection

UL ENVIRONMENT (ULE)

ULE Greenguard UL Greenguard Certification Program
1.2 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. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Blanket Insulation

Sill Sealer Insulation

Accessories

SD-08 Manufacturer's Instructions

Insulation

SD-11 Closeout Submittals

Recycled Content for Insulation Materials; S

Reduce Volatile Organic Compounds (VOC) for Insulation Materials; S

1.3 SUSTAINABLE DESIGN CERTIFICATION

Product must be third party certified in accordance with ULE Greenguard Gold.

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Delivery

Deliver materials to site in original sealed wrapping bearing manufacturer's name and brand designation, specification number, type, grade, R-value, and class. Store and handle to protect from damage. Do not allow insulation materials to become wet, soiled, crushed, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storing, and protecting of materials before and during installation.

1.4.2 Storage

Inspect materials delivered to the site for damage; unload and store out of weather in manufacturer's original packaging. Store only in dry locations, not subject to open flames or sparks, and easily accessible for inspection and handling.
1.5  SAFETY PRECAUTIONS

1.5.1  Respirators

Provide installers with dust/mist respirators, training in their use, and protective clothing, all approved by National Institute for Occupational Safety and Health (NIOSH)/Mine Safety and Health Administration (MSHA) in accordance with 29 CFR 1910.134.

1.5.2  Other Safety Concerns

Consider other safety concerns and measures as outlined in ASTM C930.

PART 2  PRODUCTS

2.1  PRODUCT SUSTAINABILITY CRITERIA

For products in this section, where applicable and to extent allowed by performance criteria, provide and document the following:

2.1.1  Recycled Content for Insulation Materials

Provide insulation materials meeting the recycled content requirements as stated within this section and provide documentation in accordance with Section 01 33 29 SUSTAINABILITY REPORTING paragraph RECYCLED CONTENT.

2.1.2  Reduce Volatile Organic Compounds (VOC) for Insulation Materials

Provide insulation materials meeting the reduced VOC requirements as stated within this section and provide documentation in accordance with Section 01 33 29 SUSTAINABILITY REPORTING paragraph REDUCE VOLATILE ORGANIC COMPOUNDS.

2.2  BLANKET INSULATION

ASTM C665, Type I, blankets without membrane coverings and II, blankets with non-reflecting coverings and III, blankets with reflective coverings; Class A, membrane-faced surface with a flame spread of 25 or less, when tested in accordance with ASTM E84.

2.2.1  Thermal Resistance Value (R-VALUE)

The R-Value must be as indicated on drawings.

2.2.2  Recycled Materials

Provide Thermal Insulation containing recycled materials to the extent practicable, provided the material meets all other requirements of this section. The minimum required recycled materials content by weight are:

Fiberglass: 20 to 25 percent glass cullet

2.2.3  Prohibited Materials

Do not provide asbestos-containing materials.

2.2.4  Reduced Volatile Organic Compounds (VOC) for Insulation Materials

ULE Greenguard Gold
2.3 SILL SEALER INSULATION

Provide polyethylene foam sill sealer inches in width with the following characteristics:

<table>
<thead>
<tr>
<th>Physical Properties</th>
<th>Test Method</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Thickness</td>
<td>ASTM D3575</td>
<td>3/16 inch</td>
</tr>
<tr>
<td>Compressive Strength</td>
<td>ASTM D3575</td>
<td>1.2 psi</td>
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<tr>
<td>- Vertical Direction</td>
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</tr>
<tr>
<td>Tensile Strength</td>
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<td>32 psi</td>
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<tr>
<td></td>
<td>Suffix T</td>
<td></td>
</tr>
</tbody>
</table>

2.4 BLOCKING

Wood, metal, unfaced mineral fiber blankets in accordance with ASTM C665, Type I, or other approved materials. Use only non-combustible materials meeting the requirements of ASTM E136 for blocking around chimneys and heat producing devices.

2.5 ACCESSORIES

2.5.1 Adhesive

As recommended by the insulation manufacturer.

Adhesives must follow the manufacturer's requirements for low pollutant emitting materials in achieving ULE Greenguard certification for their insulation products.

2.5.2 Mechanical Fasteners

Corrosion resistant fasteners as recommended by the insulation manufacturer.

2.5.3 Wire Mesh

Corrosion resistant and as recommended by the insulation manufacturer.

PART 3 EXECUTION

3.1 EXISTING CONDITIONS

Before installing insulation, ensure that areas that will be in contact with the insulation are dry and free of projections which could cause voids, compressed insulation, or punctured vapor retarders. If moisture or other conditions are found that do not allow the workmanlike installation of the insulation, do not proceed but notify Contracting Officer of such conditions.
3.2 PREPARATION

3.2.1 Blocking at Attic Vents and Access Doors

Prior to installation of insulation, install permanent blocking to prevent insulation from slipping over, clogging, or restricting air flow through soffit vents at eaves.

3.2.2 Blocking Around Heat Producing Devices

Install non-combustible blocking around heat producing devices to provide the following clearances:

a. Recessed lighting fixtures, including wiring compartments, ballasts, and other heat producing devices, unless these are certified by the manufacturer for installation surrounded by insulation: 3 inches from outside face of fixtures and devices or as required by NFPA 70 and, if insulation is to be placed above fixture or device, 24 inches above fixture.

b. Vents and vent connectors used for venting the products of combustion, flues: Minimum clearances as required by NFPA 211.

c. Gas Fired Appliances: Clearances as required in NFPA 54.

d. Oil Fired Appliances: Clearances as required in NFPA 31.

Blocking around flues is not required when insulation blanket, including any attached vapor retarder, passed ASTM E136, in addition to meeting all other requirements stipulated in Part 2.

3.3 INSTALLATION

3.3.1 Insulation

Install and handle insulation in accordance with manufacturer's instructions. Keep material dry and free of extraneous materials. Any materials that show visual evidence of biological growth due to presence of moisture must not be installed on the building project. Ensure personal protective clothing and respiratory equipment is used as required. Observe safe work practices.

3.3.1.1 Electrical wiring

Do not install insulation in a manner that would sandwich electrical wiring between two layers of insulation.

3.3.1.2 Continuity of Insulation

Install blanket insulation to butt tightly against adjoining blankets and to studs, rafters, joists, sill plates, headers and any obstructions. Provide continuity and integrity of insulation at corners, wall to ceiling joints, roof, and floor. Avoid creating thermal bridges.

3.3.1.3 Installation at Bridging and Cross Bracing

Insulate at bridging and cross bracing by splitting blanket vertically at center and packing one half into each opening. Butt insulation at bridging and cross bracing; fill in bridged area with loose or scrap insulation.
3.3.1.4 Cold Climate Requirement

Place insulation to the outside of pipes.

3.3.1.5 Insulation without Affixed Vapor Retarder

Provide snug friction fit to hold insulation in place. Stuff pieces of insulation into cracks between trusses, joists, studs and other framing, such as at attic access doors, door and window heads, jambs, and sills, band joists, and headers.

3.3.1.6 Sizing of Blankets

Provide only full width blankets when insulating between trusses, joists, or studs. Size width of blankets for a snug fit where trusses, joists or studs are irregularly spaced.

3.3.1.7 Special Requirements for Ceilings

Place insulation under electrical wiring occurring across joists. Pack insulation into narrowly spaced framing. Do not block flow of air through soffit vents.

3.3.1.8 Installation of Sill Sealer

Size sill sealer insulation and place insulation over top of masonry or concrete perimeter walls or concrete perimeter floor slab on grade. Fasten sill plate over insulation.

3.3.1.9 Special Requirements for Floors

Hold insulation in place with corrosion resistant wire mesh, wire fasteners, or wire lacing.

3.3.1.10 Access Panels and Doors

Affix blanket insulation to access panels greater than one square foot and access doors in insulated floors and ceilings. Use insulation with same R-Value as that for floor or ceiling.

3.3.2 Installation of Separate Vapor Retarder

Apply continuous vapor retarder as indicated. Overlap joints at least 6 inches and seal with pressure sensitive tape. Seal at sill, header, windows, doors and utility penetrations. Repair punctures or tears with pressure sensitive tape.

--- End of Section ---
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)


1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Architect's approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data
Closed Cell Spray Foam Insulation
Vapor retarder integral with spray foam
Intumescent Coating

SD-08 Manufacturer's Instructions
Insulation

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Delivery

Deliver materials to site in original sealed wrapping bearing manufacturer's name and brand designation, specification number, type, grade, R-value, and class. Store and handle to protect from damage. Comply with manufacturer's recommendations for handling, storing, and protecting of materials before and during installation.

1.3.2 Storage

Inspect materials delivered to the site for damage; unload and store out of weather in manufacturer's original packaging. Store only in dry locations, not subject to open flames or sparks, and easily accessible for inspection and handling.

1.4 SAFETY PRECAUTIONS

1.4.1 Respirators

Provide installers with dust/mist respirators, training in their use, and protective clothing, all approved by National Institute for Occupational Safety and Health (NIOSH)/Mine Safety and Health Administration (MSHA) in accordance with 29 CFR 1910.134.
1.4.2 Smoking

Do not smoke during installation insulation.

1.4.3 Other Safety Concerns

Consider other safety concerns and measures as outlined in ASTM C930, NFPA 70, and SCS.

PART 2 PRODUCTS

Basis of Design for Closed Cell Spray Foam Insulation System is two component system installation and intumescent coating in accordance with ICC-ES Evaluation Report ESR-2072. Apply CC Spray Foam Insulation System in areas as indicated on drawings.

Products:


b. TPR Fireshell BMS-TC Intumescent Coating manufactured by TPR Corporation. TPR2 Corp. (Thermal Product Research), 161 Interstate Ln., Waterbury, CT 06705, 203-756-TPR2, www.tpr2.com

2.1 CLOSED CELL SPRAY FOAM INSULATION

Bayseal closed-cell spray-applied polyurethane foam insulation is a two component, HFC-245fa blown, medium density, insulation application system manufactured by Bayer MaterialScience LLC, 100 Bayer Road, Pittsburgh, PA 15205-9741, Phone: 1-800-662-2927, www.spf.bayermaterialscience.com.

The Bayseal CC foam-forming system aromatic diisocyanate manufactured by Bayer MaterialScience LLC and a blended component which included polyols, fire retarding materials, and additives. Apply to achieve thermal resistance R-Value of as indicated on drawings. Products must be installed in accordance with manufacturer's instructions and ICC-ES Evaluation Report ESR-2072.

Physical Properties

<table>
<thead>
<tr>
<th>Properties</th>
<th>Test Method</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fungi Resistance:</td>
<td>ASTM G 21</td>
<td>Zero Rating</td>
</tr>
<tr>
<td>R Value (aged):</td>
<td>ASTM C518</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6.9 at 1 inch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24 at 3.5 inches</td>
</tr>
<tr>
<td></td>
<td></td>
<td>38 at 5.5 inches</td>
</tr>
<tr>
<td></td>
<td></td>
<td>54 at 7.9 inches</td>
</tr>
<tr>
<td>Compressive Strength:</td>
<td>ASTM D 1621</td>
<td>25 psi (nominal)</td>
</tr>
<tr>
<td>Core Density:</td>
<td>ASTM D 1622</td>
<td>2.0 lbs./ft³ (nominal)</td>
</tr>
<tr>
<td>Closed Cell Content:</td>
<td>ASTM D6226</td>
<td>&gt; 90%</td>
</tr>
<tr>
<td>Tensile Strength:</td>
<td>ASTM D 2126</td>
<td>60 psi (nominal)</td>
</tr>
<tr>
<td>Moisture Vapor Transmission</td>
<td>ASTM E 96/E 96M</td>
<td>0.80 Perms at 1”</td>
</tr>
<tr>
<td>(Permeance):</td>
<td></td>
<td>0.23 Perms at 3.5”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.14 Perms at 5.5”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.10 Perms at 7.9”</td>
</tr>
<tr>
<td>Water Absorption</td>
<td>ASTM D 2842</td>
<td>&lt; 2%</td>
</tr>
<tr>
<td>Dimensional Stability:</td>
<td>ASTM D 2126</td>
<td>&lt; 10%</td>
</tr>
</tbody>
</table>
158°F & 97% R.H.)

<table>
<thead>
<tr>
<th>% Change in Volume</th>
<th>Air Leakage Rate: ASTM E 2178</th>
<th>Surface Burning Characteristics** ASTM E 84</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt; 0.02 L s⁻¹ m⁻¹</td>
<td>Flame Spread Index &lt; 25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Smoke Developed Index &lt; 450</td>
</tr>
</tbody>
</table>

2.2 Vapor Permanence Integral with Spray Foam

Vapor retarder integral with spray foam, Class II vapor retarder per ESR-1655.

2.3 Intumescent Coating

Intumescent Coating required in areas not separated from the interior of the building by an approved thermal barrier or 1/2-inch thick gypsum wall board.

Basis of Design is TPR Fireshell BMS-TC Intumescent Coating manufactured by TPR Corporation, one-component, water based polymer coating. Intumescent coating shall cover insulation with 12 dry mils at a minimum rate of 1.24 gallons per 100 square feet.

PART 3 INSTALLATION

3.1 APPLICATION

A copy of manufacturer's published installation instructions and in accordance with ICC-ES Evaluation Report ESR-2072 must be available at all times on the jobsite during installation.

Before installing insulation, ensure that areas meet requirements of manufacturer's published installation instructions.

3.1.1 Bayseal Closed Cell Spray

Bayseal Closed Cell Spray foam insulation shall be applied first.

3.1.2 TPR Fireshell BMS-TC Intumescent Coating

TPR Fireshell BMS-TC Intumescent Coating shall be applied after the closed cell spray foam insulation has cured in accordance with manufacturer's published installation instructions and in accordance with ICC-ES Evaluation Report ESR-2072.

3.2 EXAMINATION

a. Do not begin installation until substrates have been properly prepared.
b. Verify that all exterior and interior wall, partition, and floor/ceiling assembly construction has been completed to the point where the insulation may correctly be installed.
c. Verify that substrate and cavities are dry and free of any foreign material that will impede application.
d. Verify that mechanical and electrical services in ceilings, walls and floors have been installed and tested and, if appropriate, verify that adjacent materials are dry and ready to receive insulation.

3.2.1 Preparation

a. Clean surfaces thoroughly prior to installation.
b. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

c. Mask and protect adjacent surfaces from overspray or dusting.

3.2.2 Installation

a. Install in accordance with manufacturer's published instructions. Product must be installed according to code, and must be applied by a qualified applicator.

b. Apply insulation by spray method, to uniform monolithic density without voids.

c. Apply to achieve thermal resistance R-Value as indicated on drawings.

d. Patch damaged areas.

3.2.3 Penetrations

Apply an additional 10 mil finish coat for 2 feet around all penetrations.

3.2.4 Protection

a. Protect installed products until completion of project.

b. Touch-up, repair or replace damaged products before Substantial Completion.

-- End of Section --
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PART 1 GENRAL

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)


ASTM INTERNATIONAL (ASTM)


ASTM D4263 (1983; R 2012) Indicating Moisture in Concrete by the Plastic Sheet Method


FM GLOBAL (FM)

FM 4470 (2010) Single-Ply, Polymer-Modified Bitumen Sheet, Built-up Roof (BUR), and Liquid Applied Roof Assemblies for Use in Class 1 and Noncombustible Roof Deck Construction

FM APP GUIDE (updated on-line) Approval Guide
http://www.approvalguide.com/

1.2 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. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings
   Insulation Board Layout and Attachment; G

SD-03 Product Data
   Insulation; G
   Cover Board; G
   Fasteners; G

SD-06 Test Reports
   Flame Spread Rating; G

SD-07 Certificates
   Volatile Organic Compounds (VOC) Content; G
   Installer Qualifications; G
   Certificates Of Compliance For Felt Materials; G

SD-08 Manufacturer's Instructions
   Nails and Fasteners; G
   Roof Insulation; G

SD-11 Closeout Submittals
   Volatile Organic Compounds (VOC) Content; S
1.3 SHOP DRAWINGS

Submit insulation board layout and attachment indicating methods of attachment and spacing, transitions, tapered components, thicknesses of materials, and closure and termination conditions. Show locations of ridges, valleys, crickets, interface with, and slope to, roof drains. Base shop drawings on verified field measurements and include verification of existing conditions.

1.4 PRODUCT DATA

Include data for material descriptions, recommendations for product shelf life, requirements for cover board or coatings, and precautions for flammability and toxicity. Include data to verify compatibility of sealants with insulation.

1.5 MANUFACTURER'S INSTRUCTIONS

Include field of roof and perimeter attachment requirements.

Provide a complete description of installation sequencing for each phase of the roofing system. Include weatherproofing procedures.

1.6 QUALITY CONTROL

Provide certification of installer qualifications from the insulation manufacturer confirming the specific installer has the required qualifications for installing the specific roof insulation system(s) indicated.

Provide certificates of compliance for felt materials.

1.7 FM APPROVAL REQUIREMENTS

Provide fastening patterns in accordance with FM 1-90 for insulation on steel decks.

1.8 FIRE PERFORMANCE REQUIREMENTS

1.8.1 Insulation in Roof Systems

Comply with the requirements of ICC IBC. Roof insulation to have a flame spread rating of 75 or less when tested in accordance with ASTM E84. Additional documentation of compliance with flame spread rating is not required when insulation of the type used for this project as part of the specific roof assembly is listed and labeled as FM Class 1 approved.

1.8.2 Thermal Barrier Requirements

Separate polystyrene insulation from a steel deck with a thermal barrier of glass mat gypsum roof board or other approved barrier material in accordance with the requirements of the ICC IBC.

1.8.3 Fire Resistance Ratings for Roofs

Provide in accordance with ICC IBC Chapter 7 and Table 721.1(3) Min Protection For Floor and Roof Systems.
1.9 CERTIFICATIONS

Provide products that are third party certified for low Volatile Organic Compounds (VOC) Content in accordance with UL 2818 Greenguard Gold, SCS Scientific Certification Systems Indoor Advantage Gold or approved equal. (http://www.scsglobalservices.com/indoor-air-quality-certification)

1.10 DELIVERY, STORAGE, AND HANDLING

1.10.1 Delivery

Deliver materials to the project site in manufacturer's unopened and undamaged standard commercial containers bearing the following legible information:

a. Name of manufacturer

b. Brand designation

c. Specification number, type, and class, as applicable, where materials are covered by a referenced specification

Deliver materials in sufficient quantity to allow continuity of the work.

1.10.2 Storage and Handling

Store and handle materials in accordance with manufacturer's printed instructions. Protect from damage, exposure to open flame or other ignition sources, wetting, condensation, and moisture absorption. Keep materials wrapped and separated from off-gassing materials (such as drying paints and adhesives). Do not use materials that have visible moisture or biological growth. Store in an enclosed building or trailer that provides a dry, adequately ventilated environment. Store felt rolls on ends. For the 24 hours immediately before application of felts, store felts in an area maintained at a temperature no lower than 50 degrees F above grade and having ventilation on all sides. Replace damaged material with new material.

1.11 ENVIRONMENTAL CONDITIONS

Do not install roof insulation during inclement weather or when air temperature is below 40 degrees F and interior humidity is 45 percent or greater, or when there is visible ice, frost, or moisture on the roof deck.

1.12 PROTECTION

1.12.1 Flame Heated Equipment

1.12.1.1 Fire Protection

Locate melt kettles no closer than 25 feet from buildings or combustible materials. Provide and maintain two approved 4-A:40-B:C fire extinguishers within 25 feet of each operating kettle. Fire extinguishers, operations and locations must comply with NFPA 1 Section Tar Kettles. Equip asphalt (tar) kettles with tight fitting lids.

1.12.1.2 Operational Requirements

Equip kettles with automatic thermostatic control capable of maintaining
asphalt temperature. Calibrate and maintain controls in working order for the duration of the work. Equip kettles with means of agitation and ensure they are operating as necessary to produce a controlled uniform temperature throughout kettle contents to prevent spot heating. Do not heat contents above flash point. Do not place flame heated equipment on the roof.

1.12.2 Special Protection

Provide special protection as approved by the insulation manufacturer.

1.12.3 Drippage of Bitumen

Seal joints in and at edges of deck as necessary to prevent drippage of asphalt into the building or onto adjacent surfaces.

1.12.4 Completed Work

Cover completed work with cover board for the duration of construction. Avoid traffic on completed work particularly when ambient temperature is above 80 degrees F. Replace crushed or damaged insulation prior to roof surface installation.

PART 2 PRODUCTS

2.1 PRODUCT SUSTAINABILITY CRITERIA

Where allowed by performance criteria:

2.1.1 Reduce Volatile Organic Compounds (VOC) Contents

Provide products with reduced VOC content and provide documentation in accordance with Section 01 33 29 SUSTAINABILITY REPORTING paragraph REDUCE VOLATILE ORGANIC COMPOUNDS.

2.1.2 Recycled Content

Provide products with recycled content and provide documentation in accordance with Section 01 33 29 SUSTAINABILITY REPORTING paragraph RECYCLED CONTENT.

2.2 INSULATION

2.2.1 Insulation Types

Roof insulation shall 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 membrane:

a. Polysiocyanurate Board: ASTM C1289, except minimum compressive strength shall be 20 pounds per square inch (psi).

b. Polystyrene Board: Shall be in accordance with ASTM C578, Type II, IV, or X.

2.2.2 Mineral-Fiber Insulation Board

ASTM C726.
2.2.3 Recovered Materials

Provide thermal insulation materials containing recycled materials to the extent practical. The required minimum recycled material content for the listed materials are:

<table>
<thead>
<tr>
<th>Material Type</th>
<th>Required Recycled Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perlite Composition Board:</td>
<td>75 percent postconsumer paper</td>
</tr>
<tr>
<td>Polyisocyanurate/polyurethane:</td>
<td>9 percent recovered material</td>
</tr>
<tr>
<td>Wood Fiberboard:</td>
<td>25 percent recovered material</td>
</tr>
<tr>
<td>Cellular Glass Insulation:</td>
<td>75 percent recovered content</td>
</tr>
<tr>
<td>Structural Fiberboard:</td>
<td>100 percent recovered content</td>
</tr>
<tr>
<td>Fiberglass Insulation:</td>
<td>20-25 percent recovered content</td>
</tr>
<tr>
<td>Fiber (felt) or Fiber composite:</td>
<td>50-100 percent recovered content</td>
</tr>
<tr>
<td>Rubber:</td>
<td>12-100 percent recovered content</td>
</tr>
<tr>
<td>Plastic or Plastic/Rubber composite:</td>
<td>100 percent recovered content</td>
</tr>
<tr>
<td>Wood/Plastic Composite:</td>
<td>100 percent Total Recovered content</td>
</tr>
</tbody>
</table>

2.2.4 Insulation Thickness

As necessary to provide a thermal resistance (R value) as indicated on drawings.

2.2.5 Tapered Roof Insulation

One layer of the tapered roof insulation assembly shall be factory tapered to a slope of not less than 1/4 inch per foot. Provide starter and filler blocks as required to provide the total thickness of insulation necessary to meet the specified slope and thermal conductance. Mitered joints shall be factory fabricated and shall consist of two diagonally cut boards or one board shaped to provide the required slopes. Identify each piece of tapered insulation board by color or other identity coding system, allowing the identification of different sizes of tapered insulation board required to complete the roof insulation system.

2.2.6 Cants and Tapered Edge Strips

Provide preformed cants and tapered edge strips of the same material as the roof insulation; or, when roof insulation material is unavailable, provide pressure-preservative treated wood, wood fiberboard, or rigid perlite board cants and edge strips as recommended by the roofing manufacturer, unless otherwise indicated. Face of cant strips shall have incline of 45 degrees and vertical height of 4 inches. Taper edge strips at a rate of one to 1 1/2 inch per foot down to approximately 1/8 inch thick.

2.3 PROTECTION BOARD

For use as a thermal barrier (underlayment), fire barrier (overlayment), or
protection board for hot-mopped, torched-down, or adhesively-applied roofing membrane over roof insulation.

2.3.1 Glass Mat Gypsum Roof Board

ASTM C1177/C1177M, 0 Flame Spread and 0 Smoke Developed when tested in accordance with ASTM E84, 500 psi, Class A, non-combustible, 5/8 inch thick, 4 by 8 feet board size.

2.4 FASTENERS

Flush-driven through flat round or hexagonal steel or plastic plates. Steel plates shall be zinc-coated, flat round not less than 1 3/8 inch diameter or hexagonal not less than 28 gage. Plastic plates shall be high-density, molded thermoplastic with smooth top surface, reinforcing ribs and not less than 3 inches in diameter. Fastener head shall recess fully into the plastic plate after it is driven. Plates shall be formed to prevent dishing. Do not use bell-or cup-shaped plates. Fasteners shall conform to insulation manufacturer's recommendations except that holding power, when driven, shall be not less than 40 pounds each in steel deck. Fasteners for steel or concrete decks shall conform to FM APP GUIDE for Class I roof deck construction, and shall be spaced to withstand uplift pressure as indicated on the drawings.

2.4.1 Fasteners for Steel Decks

Approved hardened penetrating fasteners or screws conforming to FM 4470 and listed in FM APP GUIDE for Class I roof deck construction. Quantity and placement to withstand a minimum uplift pressure of 115 psf conforming to FM APP GUIDE. See paragraph 2.3.

2.4.2 High Heat Roof Underlayment

High heat underlayment acceptable to manufacturer, basis of design is Carlisle WIP 300HT. Installation in accordance with manufacturer's written installation instructions and in accordance with ICC-ES ESR #2206.
application has cooled to ambient temperatures, test coating for adherence. Should a portion of the sample be readily stripped clean from surface, do not consider surface to be dry and do not start application. Should rain occur during application, stop work and do not resume until surface has been tested by method above and found dry.

e. Prior to installing any roof system on a concrete deck, conduct a test per ASTM D4263. The deck is acceptable for roof system application when there is no visible moisture on underside of plastic sheet after 24 hours.

3.1.2 Surface Preparation

Correct defects and inaccuracies in roof deck surface to eliminate poor drainage and hollow or low spots and perform the following:

a. Install wood nailers the same thickness as insulation at eaves, edges, curbs, walls, and roof openings for securing cant strips, gutters, and flashing flanges.

3.2 INSULATION INSTALLATION

Apply insulation in two layers with staggered joints when total required thickness of insulation exceeds 1/2 inch. Lay insulation so that continuous longitudinal joints are perpendicular to direction of roofing, as specified in Section , and end joints of each course are staggered with those of adjoining courses. When using multiple layers of insulation, joints of each succeeding layer shall be parallel and offset in both directions with respect to layer below. Keep insulation 1/2 inch clear of vertical surfaces penetrating and projecting from roof surface.

3.2.1 Installation Using Only Mechanical Fasteners

Secure total thickness of insulation with penetrating type fasteners.

3.2.2 Special Precautions for Installation of Foam Insulation

3.2.2.1 Polyisocyanurate Insulation

Where polyisocyanurate foam board insulation is provided, install 1/2 inch thick wood fiberboard, glass mat gypsum roof board, or 3/4 inch thick expanded perlite board insulation over top surface of foam board insulation. Stagger joints of insulation with respect to foam board insulation below.

3.2.2.2 Polystyrene Insulation

a. Over top surface of non-composite polystyrene board, install 1/2 inch thick high density wood fiberboard, 3/4 inch thick expanded perlite board, glass mat gypsum roof board, or other overlayment approved by roofing sheet manufacturer. Tightly butt and stagger joints of field applied overlayment board at least 6 inches with respect to the polystyrene board below. Apply 6 inch wide glass fiber roofing tape centered over joints and edges of overlayment board.

b. Where composite boards consisting of polystyrene insulation are provided, apply 6 inch wide glass-fiber roofing tape centered over joints and edges of composite board. Apply joint strips as recommended by roofing sheet manufacturer.
3.2.3 High Heat Roof Underlayment

High heat underlayment acceptable to manufacturer, basis of design is Carlisle WIP 300HT. Installation in accordance with manufacturer's written installation instructions and in accordance with ICC-ES ESR #2206.

3.2.4 Tapered Edge Strips

Where indicated, provide edge strips in the right angle formed by junction of roof and wood nailing strips that extend above level of roof. Install edge strips flush against vertical surfaces of wood nailing strips. Where possible, nail edge strips to adjoining surfaces. Where installed against non-nailable materials, install in .

3.3 PROTECTION

3.3.1 Protection of Applied Insulation

Completely cover each day's installation of insulation with the finished roofing specified in on same day. Do not permit phased construction. Protect open spaces between insulation and parapets or other walls and spaces at curbs, scuttles, and expansion joints, until permanent roofing and flashing are applied. Exposed edges of the insulation shall be protected by cutoffs at the end of each work day or whenever precipitation is imminent. Fill all profile voids in cut-offs to prevent entrapping of moisture into the area below the membrane. Cutoffs shall be removed when work is resumed.

3.3.2 Damaged Work and Materials

Restore work and materials that become damaged during construction to original condition or replace with new materials.

3.4 INSPECTION

The Contractor shall establish and maintain an inspection procedure to assure compliance of the installed roof insulation with the contract requirements. Any work found not to be in compliance with the contract shall be promptly removed and replaced or corrected in an approved manner. Quality control shall include, but not be limited to, the following:

a. Observation of environmental conditions; number and skill level of insulation workers; start and end time of work.

b. Verification of certification, listing or label compliance with FM P9513.

c. Verification of proper storage and handling of insulation and vapor retarder materials before, during, and after installation.

d. Inspection of vapor retarder application, including edge envelopes and mechanical fastening.

e. Inspection of mechanical fasteners; type, number, length, and spacing.
f. Coordination with other materials, sleepers, and nailing strips.

g. Inspection of insulation joint orientation and laps between layers, joint width and bearing of edges of insulation on deck.

h. Installation of cutoffs and proper joining of work on subsequent days.

i. Continuation of complete roofing system installation to cover insulation installed same day.

-- End of Section --
PART 1   GENERAL
1.1   REFERENCES

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

**AIR BARRIER ASSOCIATION OF AMERICA (ABAA)**

- **ABAA Accreditation**
- **ABAA QAP**

**ASTM INTERNATIONAL (ASTM)**

- **ASTM D4263** (1983; R 2012) Indicating Moisture in Concrete by the Plastic Sheet Method
- **ASTM E283** (2004; R 2012) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
Uniform Static Air Pressure Difference


NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)


1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Architect's approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals
  Qualifications of Manufacturer; G
  Qualifications of Installer; G

SD-02 Shop Drawings
  Fluid-Applied Membrane Air Barrier; G

SD-03 Product Data
  Fluid-Applied Membrane Air Barrier; G
  Primers, Adhesives, and Mastics; G
  Reinforcement; G
  Safety Data Sheets; G

SD-04 Samples
  Fluid-Applied Membrane Air Barrier Mockup; G

SD-06 Test Reports
  Capillary Moisture Test; G
  Field Peel Adhesion Test; G
  Flame Propagation of Wall Assemblies; G
Flame Spread and Smoke Developed Index Ratings; G
Site Inspections Reports; G
SD-07 Certificates
Fluid-Applied Membrane Air Barrier; G
Qualifications of Manufacturer; G
Qualifications of Installer; G
SD-08 Manufacturer's Instructions
Fluid-Applied Membrane Air Barrier; G
Primers, Adhesives, and Mastics; G
SD-11 Closeout Submittals
Volatile Organic Compound (VOC) Content; S

1.3 MISCELLANEOUS REQUIREMENTS

For fluid-applied membrane air barriers provide the following:

1.3.1 Shop Drawings

Submit fluid-applied membrane air barrier shop drawings showing locations and extent of barrier assemblies, transition membranes, details of all typical conditions, intersections with other envelope assemblies and materials, and membrane counterflashings. Show details for bridging of gaps in construction, treatment of inside and outside corners, expansion joints, methods of attachment of materials covering the self-adhered barrier without compromising the barrier. Indicate how miscellaneous penetrations such as conduit, pipes, electric boxes, brick ties, and similar items will be sealed.

1.3.2 Product Data

Submit manufacturer's technical data indicating compliance with performance and environmental requirements, manufacturer's printed instructions for evaluating, preparing, and treating substrates, temperature and other limitations of installation conditions, safety requirements for installation, and Safety Data Sheets. Indicate flame and smoke spread ratings for all products.

1.3.3 Mockup

Provide a mockup of the fluid-applied membrane air barrier. Apply product in an area designated by the Contracting Officer. Apply an area of not less than 54 square feet. Include all components specified as representative of the complete system. Notify the Contracting Officer a minimum of 48 hours prior to the test application. Select a test area representative of conditions to be covered including window or door openings, wall to ceiling transitions, flashings, and penetrations, as
1.3.4 Test Reports

Submit test reports indicating that capillary moisture tests and field peel adhesion tests on all substrate materials have been performed and the changes made, if required, in order to achieve successful and lasting adhesion. Submit test reports for flame propagation of wall assemblies tested in accordance with NFPA 285. Submit test reports for flame spread and smoke developed index ratings of barrier materials tested in accordance with ASTM E84.

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Delivery

Deliver and store materials in sufficient quantity to allow for uninterrupted flow of work. Inspect materials delivered to the site for damage and store out of weather. Deliver materials to the jobsite in their original unopened packages, clearly marked with the manufacturer's name, brand designation, description of contents, and shelf life of containerized materials. Store and handle to protect from damage.

1.4.2 Storage

Inspect materials delivered to the site for damage; unload and store out of weather in manufacturer's original packaging. Store only in dry locations, not subject to open flames or sparks, and easily accessible for inspection and handling. Protect stored materials from direct sunlight.

1.5 CAPILLARY MOISTURE TEST

Perform a capillary moisture test by plastic sheet method in accordance with ASTM D4263 on the construction mockup and substrate materials. Perform test after curing period as recommended by the air barrier manufacturer. Record mode of failure and area which failed in accordance with ASTM D4263. Once the air barrier material manufacturer has established a minimum adhesion or moisture level for the product on the particular substrate, indicate on the inspection report whether this requirement has been met. Where the manufacturer has not declared a minimum adhesion or moisture value for their product and substrate combination, the inspector must record actual values.

1.6 FIELD PEEL ADHESION TEST

Perform a field peel adhesion test on a construction mockup. Test the applied product for adhesion in accordance with manufacturer's recommendations. Perform test after curing period recommended by the manufacturer. Record mode of failure and area which failed in accordance with ASTM D4541. When the manufacturer has established a minimum adhesion level for the product on the particular substrate, the inspection report must indicate whether this requirement has been met. Where the manufacturer has not declared a minimum adhesion value for their product/substrate combination, the inspector must record actual values.
1.7 QUALITY ASSURANCE

1.7.1 Qualifications of Manufacturer

Submit documentation verifying that manufacturer of fluid-applied membrane air barrier is currently accredited by the Air Barrier Association of America (ABAA Accreditation https://www.airbarrier.org/).

1.7.2 Qualifications of Installer

Submit documentation verifying that installers of the fluid-applied membrane air barrier are currently certified in accordance with the ABAA QAP Quality Assurance Program (https://www.airbarrier.org/qap/).

1.8 PRECONSTRUCTION MEETING

Conduct a preconstruction meeting a minimum of two weeks prior to commencing work specified in this Section. Agenda must include, at a minimum, construction and testing of construction mock up, sequence of construction, coordination with substrate preparation, materials approved for use, compatibility of materials, coordination with installation of adjacent and covering materials, and details of construction. Attendance is required by representatives of related trades including covering materials, substrate materials, adjacent materials, and materials and components of the fluid-applied membrane air barrier.

1.9 ENVIRONMENTAL CONDITIONS

1.9.1 Temperature

Install fluid-applied membrane air barrier within the range of ambient and substrate temperatures as recommended in writing by the fluid-applied membrane air barrier manufacturer. Do not apply fluid-applied membrane air barrier to a damp or wet substrate. Do not apply during inclement weather or when ice, frost, surface moisture, or visible dampness is present on surfaces to be covered, or when precipitation is imminent.

1.9.2 Exposure to Weather

Protect fluid-applied membrane air barrier products from direct exposure to rain, snow, sunlight, mist, and other extreme weather conditions. Replace, at no additional cost to the government, barrier products that have been exposed to ultraviolet (sun)light longer than allowed by manufacturer's written requirements.

PART 2 PRODUCTS

2.1 REDUCED VOLATILE ORGANIC COMPOUND (VOC) CONTENT

Provide products with reduced VOC content and provide documentation in accordance with Section 01 33 29 SUSTAINABILITY REPORTING.2.2 FLUID-APPLIED MEMBRANE AIR BARRIER

Provide a fluid-applied, vapor retarding, air barrier. This barrier must exhibit no visible water leakage when tested in accordance with ASTM E331 and must perform as a liquid water drainage plane with thru-wall flashing to discharge incidental condensation and water penetration to the exterior of the building enclosure. Provide products suitable for use within temperature ranges specified by manufacturer for the location of the
2.2.1 Physical Properties

a. Air Permeance (ASTM E2178): less than 0.004 CFM per sf at 1.57 psf.

b. Air Leakage (ASTM E2357, ASTM E283): Less than 0.04 CFM per sf at 1.57 psf at one inch.

c. Water Vapor Permeance (Vapor Impermeable Membrane) (ASTM E96/E96M, desiccant method A): 0.1 perms or less.

d. Tensile Strength (ASTM D412): Not less than 138 psi.

e. Elongation (ASTM D412): Not less than 300 percent.

f. Low temperature Flexibility and Crack Bridging (ASTM C836/C836M): Pass at minus 15 degrees F.

g. Solids by Volume: minimum 50 percent.

h. Flame propagation of wall assemblies (NFPA 285): Pass

i. Surface Burning Characteristics (ASTM E84):
   (1) Flame Spread Index Rating not higher than 75.
   (2) Smoke Developed Index Rating not higher than 150.


2.3 PRIMERS, ADHESIVES, AND MASTICS

Provide primers, adhesives, mastics, sealants and other accessories as recommended by manufacturer of fluid-applied membrane air barrier for a complete installation.

2.4 SHEET METAL FLASHING

Provide as specified in Section 07 60 00 FLASHING AND SHEET METAL.

2.5 JOINT SEALANTS

Provide as specified in Section 07 92 00 JOINT SEALANTS.

2.6 REINFORCEMENT

Provide fiberglass mesh tape, or fluid-applied air barrier manufacturer's approved comparable equal product, reinforcement at seams, edges, projections and penetrations. Reinforce all joints exceeding 1/4 inch with fiberglass mesh.

PART 3 EXECUTION

3.1 EXAMINATION

Before installing fluid-applied membrane air barrier, examine substrates, areas, and conditions under which fluid-applied membrane air barrier
assemblies will be applied, with installer present, for compliance with requirements. Ensure the following conditions are met:

a. Surfaces are sound, dry, even, and free of oil, grease, dirt, excess mortar or other contaminants detrimental to the adhesion of the membranes.

b. Concrete and masonry surfaces are cured and dry, smooth without large voids, spalled areas or sharp protrusions. Do not proceed with installation until after minimum concrete curing period recommended by fluid-applied membrane air barrier manufacturer.

c. Fill voids, gaps and spalled areas in substrate to provide an even plane. Strike masonry joints full flush.

d. Verify substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method in accordance with ASTM D4263 and take suitable measures until substrate passes moisture test.

e. Verify sealants used in substrates, and in joints between substrates, are compatible with fluid-applied membrane air barrier.

3.2 PREPARATION

Clean, prepare, and treat substrate in accordance with manufacturer's written instructions. Ensure clean, dust-free, and dry substrate for fluid-applied membrane air barrier application.

a. Remove dust, dirt and other contaminants from joints and cracks before coating surfaces.

b. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through fluid-applied membrane air barrier.

c. At changes in substrate plane, provide transition material (bead of sealant, mastic, extruded silicone sealant, membrane counterflashing or other material recommended by manufacturer) under transition membrane to eliminate all sharp 90 degree inside corners and to make a smooth transition from one plane to another.

d. Provide mechanically fastened non-corrosive metal sheet to span gaps in substrate plane and to make a smooth transition from one plane to the other. Continuously support membrane with substrate.

e. For exterior sheathing substrates, ensure that exterior sheathing is stabilized, with corners and edges fastened with appropriate screws. Treat all joints in accordance with the air barrier manufacturer's instructions prior to application of air barrier material. Allow sufficient time for joint treatments to fully cure before application of transition membranes and fluid-applied membrane air barrier.

f. For concrete and masonry substrates, fill all voids and holes, particularly in mortar joints, with non-shrinking grout.

g. Mask off and cover adjacent surfaces to protect from spillage and overspray.
3.3 INSTALLATION

3.3.1 Installation of Flashing

Counterflash upper edge of thru-wall flashing and fluid-applied air barrier. Counter flashing and thru-wall flashing are specified in Section 07 60 00 FLASHING AND SHEET METAL.

3.3.2 Installation of Fluid-Applied Membrane Air Barrier

Install materials in accordance with manufacturer's recommendations and the following:

a. Apply fluid-applied membrane air barrier in single or dual coat application by spray or roller. Apply fluid-applied membrane air barrier within manufacturer's recommended temperature range for application.

b. Apply fluid-applied membrane air barrier at rate recommended by manufacturer to yield a wet film thickness of 90 mils.

c. Apply fluid-applied membrane air barrier around all penetrations ensuring a complete and continuous air barrier. Lap fluid-applied membrane air barrier a minimum of 3 inch over transition membrane to seal leading edge.

d. Seal membrane terminations, heads of mechanical fasteners, masonry tie fasteners, around penetrations, HVAC assemblies, plumbing and electrical assemblies, doors, windows, louvers, and other assemblies penetrating the fluid-applied membrane air barrier with a termination sealant recommended by the fluid-applied membrane air barrier manufacturer.

e. Notify the Contracting Officer and Testing Agency upon completion of fluid-applied membrane air barrier installation. Air barrier materials and assemblies must remain exposed until tested and inspected by the ABAA.

f. Do not allow materials to come in contact with chemically incompatible materials.

3.3.3 Installation of Reinforcement

Install reinforcement at projections, corners, joints, and penetrations where applicable.

3.4 FIELD QUALITY CONTROL

3.4.1 Site Inspections and Testing

Provide site inspections and testing in accordance with ABAA protocol to verify conformance with the manufacturer's instructions, the ABAA QAP Quality Assurance Program (https://www.airbarrier.org/qap/), and this section.

a. Conduct inspections and testing at 5, 50, and 95 percent completion of this scope of work. Forward written inspection reports to the Contracting Officer within five working days of the inspection and test being performed.
b. If the inspections reveal any defects, promptly remove and replace defective work at no additional expense to the Government.

3.5 PROTECTION AND CLEANING

3.5.1 Protection

Protect fluid-applied membrane air barrier assemblies from damage during application and remainder of construction in accordance with manufacturer's written instructions.

Coordinate installation, testing, and inspection procedures to ensure exposure period does not exceed that recommended by the product manufacturer. Remove and replace, at no additional cost to the government, membrane products that exceed manufacturer's allowed exposure limits.

3.5.2 Cleaning of Adjacent Surfaces

Clean excess product from adjacent construction using cleaning agents and procedures as recommended in writing by the manufacturer of each type of affected construction and as acceptable to same.

3.6 CLEANUP OF SPILLS

Conduct cleanup of uncured product spillage in accordance with manufacturer's written safe handling instructions.

-- End of Section --
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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 IRON AND STEEL INSTITUTE (AISI)

AISI S100 (2012) North American Specification for the Design of Cold-Formed Steel Structural Members

AISI SG03-3 (2002; Suppl 2001-2004; R 2008) Cold-Formed Steel Design Manual Set

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)


AMERICAN WELDING SOCIETY (AWS)


AWS D1.1/D1.1M (2015; Errata 1 2015; Errata 2 2016) Structural Welding Code - Steel

AWS D1.2/D1.2M (2014) Structural Welding Code - Aluminum

ASTM INTERNATIONAL (ASTM)


ASTM A653/A653M (2017) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or
Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process


ASTM A924/A924M (2017a) Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process


ASTM C792 (2004; R 2008) Effects of Heat Aging on Weight Loss, Cracking, and Chalking of Elastomeric Sealants


Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing


ASTM D3363 (2005; E 2011; R 2011; E 2012) Film Hardness by Pencil Test


ASTM D4587 (2011) Standard Practice for Fluorescent UV-Condensation Exposures of Paint and Related Coatings


ASTM D610 (2008; R 2012) Evaluating Degree of Rusting on Painted Steel Surfaces

ASTM D714 (2002; R 2009) Evaluating Degree of Blistering of Paints


ASTM E1592 (2005; R 2012) Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference


1.2 DESCRIPTION OF METAL ROOF SYSTEM

1.2.1 Performance Requirements

Steel panels and accessory components must conform to the following standards:

ASTM A1008/A1008M
ASTM A123/A123M
ASTM A36/A36M
ASTM A463/A463M for aluminum coated steel sheet
ASTM A755/A755M for metallic coated steel sheet for exterior coil prepainted applications.
ASTM A924/A924M for metallic coated steel sheet
ASTM D522/D522M for applied coatings
UL Bld Mat Dir

1.2.1.1 Hydrostatic Head Resistance

No water penetration when tested according to ASTM E2140. Submit leakage
test report upon completion of installation.

1.2.1.2 Wind Uplift Resistance

Provide metal roof panel system that conform to the requirements of ASTM E1592 and UL 580. Uplift force due to wind action governs the design for panels. Submit wind uplift test report prior to commencing installation.

Roof system and attachments must resist the wind loads as determined by ASCE 7, in pounds per square foot. Metal roof panels and component materials must also comply with the requirements in FM 4471 as part of a panel roofing system as listed in Factory Mutual Guide (FMG) "Approval Guide" for class 1 or noncombustible construction, as applicable. Identify all materials with FMG markings.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Architect's approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings
- Roofing Panels; G
- Flashing and Accessories; G
- Gutter/Downspout Assembly; G

SD-03 Product Data
Submit manufacturer's catalog data for the following items:
- Roof Panels; G
- Factory-Applied Color Finish; G
- Accessories; G
- Fasteners; G
- Pressure Sensitive Tape; G
- Underlayments; G
- Gaskets and Sealing/Insulating Compounds; G
- Coil Stock; G
- Aluminized Steel Repair Paint; G

SD-04 Samples
- Roof Panels; G
- Factory-applied Color Finish, Samples, 9 inch lengths, full width; G
Accessories; G
Fasteners; G
Gaskets and Sealant/Insulating Compounds; G

SD-05 Design Data
Wind Uplift Resistance; G

SD-06 Test Reports
Leakage Test Report; G
Wind Uplift Test Report; G
Fire Rating Test Report; G
Factory Finish and Color Performance Requirements; G

SD-07 Certificates
Roof Panels; G
Coil Stock Compatibility; G
Self-Adhering Sheet Membrane Underlayment; G
Qualification of Manufacturer; G
Qualification of Applicator; G

SD-08 Manufacturer's Instructions
Insulation; G
Installation Manual; G

SD-09 Manufacturer's Field Reports
Manufacturer's Field Inspection Reports; G

SD-11 Closeout Submittals
Warranties; G
Information Card; G

1.4 QUALITY ASSURANCE

1.4.1 Qualification of Manufacturer

Submit documentation verifying metal roof panel manufacturer has been in the business of manufacturing metal roof panels for a period of not less than 5 years.

Manufacturer must also provide engineering services by an authorized engineer, currently licensed in the geographic area of the project, with a
minimum of five (5) years experience as an engineer knowledgeable in roof wind design analysis, protocols and procedures for MBMA RSDM, ASCE 7, UL 580, and FM 4471. Engineer must provide certified engineering calculations for the project conforming to the stated references.

1.4.1.1 Single Source

Roofing panels, clips, closures, and other accessories must be standard products of the same manufacturer, and the most recent design of the manufacturer to operate as a complete system for the intended use.

1.4.2 Qualification of Applicator

Metal roof system applicator must be approved, authorized, or licensed in writing by the roof panel manufacturer and have a minimum of three years experience as an approved, authorized, or licensed applicator with that manufacturer, approved at a level capable of providing the specified warranty. Supply the names, locations and client contact information of 5 projects of similar size and scope constructed by applicator using the manufacturer's roofing products submitted for this project within the previous three years.

1.4.3 Field Verification

Prior to the preparation of drawings and fabrication, verify location of roof framing, roof openings and penetrations, and any other special conditions. Indicate all special conditions and measurements on final shop drawings.

1.4.4 Qualifications for Welding Work

Welding procedures must conform to AWS D1.1/D1.1M for steel or AWS D1.2/D1.2M for aluminum.

Operators are permitted to make only those types of weldments for which each is specifically qualified.

1.4.5 Pre-roofing Conference

After approval of submittals and before performing roofing system installation work, hold a pre-roofing conference to review the following:

a. Drawings, specifications, and submittals related to the roof work. Submit, as a minimum; sample profiles of roofing panels, with factory-applied color finish samples, flashing and accessories, gutter/downspout assembly samples, typical fasteners and pressure sensitive tape, sample gaskets and sealant/insulating compounds. Also include data and 1/2 pint sample of aluminized steel repair paint and technical data on coil stock and coil stock compatibility, and manufacturer's installation manual.

b. Roof system components installation;

c. Procedure for the roof manufacturer's technical representative's onsite inspection and acceptance of the roofing substrate, the name of the manufacturer's technical representatives, the frequency of the onsite visits, distribution of copies of the inspection reports from the manufacturer's technical representative;
d. Contractor's plan for coordination of the work of the various trades involved in providing the roofing system and other components secured to the roofing; and

e. Quality control plan for the roof system installation;

f. Safety requirements.

Coordinate pre-roofing conference scheduling with the Contracting Officer. Attendance is mandatory for the Contractor, the Contracting Officer's designated personnel, personnel directly responsible for the installation of metal roof system, flashing and sheet metal work, other trades interfacing with the roof work, and representative of the metal roofing manufacturer. Before beginning roofing work, provide a copy of meeting notes and action items to all attending parties. Note action items requiring resolution prior to start of roof work.

1.5 DELIVERY, HANDLING, AND STORAGE

Deliver, store, and handle panel materials, bulk roofing products, accessories, and other manufactured items in a manner to prevent damage and deformation, as recommended by the manufacturer, and as specified.

1.5.1 Delivery

Package and deliver materials to the site in undamaged condition. Provide adequate packaging to protect materials during shipment. Do not uncrate materials until ready for use, except for inspection. Immediately upon arrival of materials at jobsite, inspect materials for damage, deformation, dampness, and staining. Remove affected materials from the site and immediately replace. Remove moisture from wet materials not otherwise affected, restack and protect from further moisture exposure.

1.5.2 Handling

Handle materials in a manner to avoid damage. Select and operate material handling equipment so as not to damage materials or applied roofing.

1.5.3 Storage

Stack materials stored on site on platforms or pallets, and cover with tarpaulins or other weathertight covering which prevents trapping of water or condensation under the covering. Store roof panels so that water which may have accumulated during transit or storage will drain off. Do not store panels in contact with materials that might cause staining. Secure coverings and stored items to protect from wind displacement.

1.6 PROJECT CONDITIONS

Weather Limitations: Proceed with installation only when existing and forecast weather conditions permit metal roof panel work to be performed according to manufacturer's written instructions and warranty requirements, and specified safety requirements.

1.7 FABRICATION

Fabricate and finish metal roof panels and accessories on a rolling mill to the greatest extent possible, per manufacturer's standard procedures and processes, and as necessary to fulfill indicated performance requirements.
Comply with indicated profiles, dimensional and structural requirements.

Provide panel profile, as indicated on drawings for full length of panel. Fabricate panel side laps with factory installed separator strips providing a weather tight seal and preventing metal-to-metal contact, and minimizing noise from movements within the panel assembly.

1.7.1 Finishes

Finish quality and application processes must conform to the related standards specified within this section. Noticeable variations within the same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved samples and are assembled or installed to minimize any contrasting variations.

1.7.2 Accessories

Fabricate flashing and trim to comply with recommendations in SMACNA 1793 as applicable to the design, dimensions, metal, and other characteristics of the item indicated.

a. Form exposed sheet metal accessories which are free from excessive oil canning, buckling, and tool marks, and are true to line and levels indicated, with exposed edges folded back to form hems.

b. End Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer.

c. Sealed Joints: Form non-expansion, but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA 1793.

d. Conceal fasteners and expansion provisions where possible.

e. Fabricate cleats and attachments devices of size and metal thickness recommended by SMACNA or by metal roof panel manufacturer for application, but not less than the thickness of the metal being secured.

1.8 WARRANTIES

Provide metal roof system material and workmanship warranties meeting specified requirements. Provide revision or amendment to manufacturer's standard warranty as required to comply with the specified requirements.

1.8.1 Metal Roof Panel Manufacturer Warranty

Furnish the metal roof panel manufacturer's 20-year no dollar limit roof system materials and installation workmanship warranty, including flashing, components, trim, and accessories necessary for a watertight roof system construction. Make warranty directly to the Government, commencing at time of Government's acceptance of the roof work. The warranty must state that:

a. If within the warranty period, the metal roof system, as installed for its intended use in the normal climatic and environmental conditions of the facility, becomes non-watertight, shows evidence of moisture intrusion within the assembly, displaces, corrodes, perforates, separates at the seams, or shows evidence of excessive weathering due to defective materials or installation workmanship, the repair or replacement of the defective and damaged materials of the metal roof...
system and correction of defective workmanship is the responsibility of the metal roof panel manufacturer. All costs associated with the repair or replacement work are the responsibility of the metal roof panel manufacturer.

b. If the manufacturer or his approved applicator fail to perform the repairs within 24 hours of notification, emergency temporary repairs performed by others does not void the warranty.

1.8.2 Manufacturer's Finish Warranty

Provide a manufacturer's no-dollar-limit 20 year warranty for the roofing system. Issue the warranty directly to the Government at the date of Government acceptance, warranting that the factory color finish, under normal atmospheric conditions at the site, will not crack, peel, or delaminate; chalk in excess of a numerical rating of 8 when measured in accordance with ASTM D4214; or fade or change colors in excess of 5 NBS units as measured in accordance with ASTM D2244.

1.8.3 Metal Roof System Installer Warranty

Provide the "Contractors Five (5)5 Year No Penal Sum Warranty for Non-Structural Metal Roof System" attached at the end of this section.

1.8.4 Continuance of Warranty

Repair or replacement work that becomes necessary within the warranty period must be approved, as required, and accomplished in a manner so as to restore the integrity of the roof system assembly and validity of the metal roof system manufacturer warranty for the remainder of the manufacturer warranty period.

1.9 CONFORMANCE AND COMPATIBILITY

The entire metal roofing and flashing system must be in accordance with specified and indicated requirements, including wind resistance requirements. Work not specifically addressed and any deviation from specified requirements must be in general accordance with recommendations of the MBMA RSDM, NRCA RoofMan, the metal panel manufacturer's published recommendations and details, and compatible with surrounding components and construction. Submit any deviation from specified or indicated requirements to the Contracting Officer for approval prior to installation.

PART 2 PRODUCTS

2.1 ROOF PANELS

2.1.1 Steel Sheet Panels

Roll-form steel sheet roof panels to the specified profile, with fy = 30 ksi, 26 gauge and depth as indicated.

Material must be plumb and true, and within the tolerances listed:

a. Aluminum-Zinc alloy coated steel sheet conforming to ASTM A792/A792M and AISI SG03-3.

b. Individual panels to have continuous length sufficient to cover the entire length of any unbroken roof slope with no joints or seams and
formed without warping, waviness, or ripples that are not a part of the panel profile and free from damage to the finish coating system.

c. Provide panels with thermal expansion and contraction consistent with the type of system specified, and the following profile:

(1) profile and coverage to be a minimum height and width from the manufacturer's standard for the indicated roof slope.

2.2 FACTORY FINISH AND COLOR PERFORMANCE REQUIREMENTS

All panels are to receive a factory applied Kynar 500/Hylar 5000 finish consisting of a baked topcoat with a manufacturer's recommended prime coat conforming to the following:

a. Metal Preparation: All metal is to have the surfaces carefully prepared for painting on a continuous process coil coating line by alkali cleaning, hot water rinsing, application of chemical conversion coating, cold water rinsing, sealing with an acid rinse, and thorough drying.

b. Prime Coating: A base coat of epoxy paint, specifically formulated to interact with the top-coat, is to be applied to the prepared surfaces by roll coating to a dry film thickness of 0.20 plus 0.05 mils. The prime coat must be oven cured prior to application of the finish coat.

c. Exterior Finish Coating: Apply the exterior finish coating over the primer by roll coating to a dry film thickness of 0.80 plus 0.05 mils (3.80 plus 0.05 mils for Vinyl Plastisol) for a total dry film thickness of 1.00 plus 0.10 mils (4.00 plus 0.10 mils for Vinyl Plastisol). This exterior finish coat must be oven-cured.

d. Interior finish coating: Apply a wash coat on the reverse side over primer by roll coating to a dry film thickness of 0.30 plus 0.05 mils for a total dry fill thickness of 0.50 plus 0.10 mils. The wash coat must be oven cured.

e. Color: The exterior finish chosen from the manufacturer's standard color chart.

f. Physical Properties: Coating must conform to the industry and manufacturer's standard performance criteria as listed by the following certified test reports:

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Test Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>ASTM D5894 and ASTM D4587</td>
</tr>
<tr>
<td>Abrasion</td>
<td>ASTM D968</td>
</tr>
<tr>
<td>Adhesion</td>
<td>ASTM D3359</td>
</tr>
<tr>
<td>Chalking</td>
<td>ASTM D4214</td>
</tr>
<tr>
<td>Chemical Pollution</td>
<td>ASTM D1308</td>
</tr>
<tr>
<td>Color Change and Conformity</td>
<td>ASTM D2244</td>
</tr>
</tbody>
</table>
Creepage: ASTM D1654
Cyclic Corrosion Test: ASTM D5894
Flame Spread: ASTM E84
Flexibility: ASTM D522/D522M
Formability: ASTM D522/D522M
Gloss at 60 and 85 degrees: ASTM D523
Humidity: ASTM D2247 and ASTM D714
Oxidation: ASTM D610
Pencil Hardness: ASTM D3363
Reverse Impact: ASTM D2794
Salt Spray: ASTM B117
Weatherometer: ASTM G152, ASTM G153 and ASTM D822

2.2.1 Specular Gloss

Finished roof surfaces to have a specular gloss value of 30 plus or minus 5 at an angle of 60 degrees when measured in accordance with ASTM D523.

2.3 MISCELLANEOUS METAL FRAMING

2.3.1 General

Provide cold formed metallic-coated steel sheet conforming to ASTM A653/A653M, AISI S100, and as specified in 05 40 00 COLD-FORMED METAL FRAMING unless otherwise indicated.

2.3.2 Fasteners and Miscellaneous Metal Framing

Provide compatible type, corrosion resistant, of sufficient size and length to penetrate the supporting element a minimum of one inch with other required properties to fasten miscellaneous metal framing members to substrates in accordance with the roof panel manufacturer's and ASCE 7 requirements.

2.3.2.1 Exposed Fasteners

Fasteners for roof panels must be corrosion resistant and compatible with the sheet panel or flashing material and of the type and size recommended by the manufacturer to meet the performance requirements and design loads. Fasteners for accessories must be the manufacturer's standard. Provide an integral metal washer, matching the color of attached material with compressible sealing EPDM gasket approximately 3/32 inch thick for exposed fasteners.
2.3.2.2 Screws

Provide corrosion resistant screws of the type and size recommended by the manufacturer to meet the performance requirements.

2.3.2.3 Rivets

Provide closed-end type rivets, corrosion resistant, where watertight connections are required.

2.3.2.4 Attachment Clips

Provide stainless steel, series 300 clips. Size, shape, thickness and capacity must meet the thickness and design load criteria specified.

2.3.3 Electrodes for Manual, Shielded Metal Arc Welding

Electrodes for manual, shielded metal arc welding must meet the requirements of AWS D1.1/D1.1M, and be covered, mild-steel electrodes conforming to AWS A5.1/A5.1M.

2.4 ACCESSORIES

Accessories must be compatible with the metal roof panels. Sheet metal flashing, trim, metal closure strips, caps, and similar metal accessories must be not less than the minimum thicknesses specified for roof panels. Provide exposed metal accessories to match the panels furnished. Molded foam rib, ridge and other closure strips must be closed-cell or solid-cell synthetic rubber or neoprene premolded to match configuration of the panels and not absorb or retain water.

2.4.1 Pre-manufactured Accessories

Pre-manufactured accessories must be manufacturer's standard for intended purpose, compatible with the metal roof system and approved for use by the metal roof panel manufacturer. Construct curbs to match roof slope.

2.4.2 Metal Closure Strips

Provide factory fabricated steel closure strips of the same gauge, color, finish and profile as the specified roof panel.

2.4.3 Rubber Closure Strips

Provide closed-cell, expanded cellular rubber closure strips conforming to ASTM D1056 and ASTM D1667, extruded or molded to the configuration of the specified roof panel profile and in lengths supplied by roof panel manufacturer.

2.5 JOINT SEALANTS

2.5.1 Sealants

Sealants are to be an approved gun type for use in hand or air pressure caulking guns at temperatures above 40 degrees F (or frost-free application at temperatures above 10 degrees F) with a minimum solid content of 85 percent of the total volume. Sealant must dry with a tough, durable surface skin which permits it to remain soft and pliable underneath, providing a weather tight joint. No migratory staining, in conformance
with to ASTM C792, is permitted on painted or unpainted metal, stone, glass, vinyl or wood.

Prime all joints to receive sealants with a compatible one-component or two-component primer as recommended by the roof panel manufacturer.

2.5.1.1 Shop Applied Sealants

Sealant for shop-applied caulking must be an approved gun grade, non-sag one-component polysulfide or silicone conforming to ASTM C792 and ASTM C920, Type II, with a curing time which ensures the sealants plasticity at the time of field erection. Color to match panel color.

2.5.1.2 Field Applied Sealants

Sealants for field-applied caulking must be an approved gun grade, non-sag on-component polysulfide or two component polyurethane with an initial maximum Shore A durometer hardness of 25, conforming to ASTM C920, Type II. Color to match panel color.

2.5.1.3 Tape Sealants

Provide pressure sensitive, 100 percent solid tape sealant with a release paper backing; permanently elastic, non-sagging, non-toxic and non-staining as approved by the roof panel manufacturer.

2.5.2 Sheet Metal Flashing and Trim

2.5.2.1 Fabrication, General

Custom fabricate sheet metal flashing and trim to comply with recommendations within the SMACNA 1793 that apply to design, dimensions, metal type, and other characteristics of design indicated. Shop fabricate items to the greatest extent possible. Obtain and verify field measurements for accurate fit prior to shop fabrication. Fabricate flashing and trim without excessive oil canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.

2.5.2.2 Roof Drainage Sheet Metal Fabrications

Gutters: Fabricate to cross section indicated, with riveted and soldered joints, complete with end pieces, outlet tubes, and other special accessories as required. Fabricate in minimum 96 inch long sections. Fabricate expansion joints and accessories from the same metal as gutters, unless otherwise indicated.

Downspouts: Fabricate rectangular downspouts complete with mitered elbows. Furnish with metal hangars of same material as downspouts and anchors.

2.6 INSULATION

Insulation, facer material and attachment must be compatible with metal roof system specified, as approved by the roof panel manufacturer, and conform to ASTM C552 (cellular glass) or ASTM C553 (fiber blankets).
2.6.1 Fire Rated Roof Panel Assembly

Provide materials for fire-rated roof panel construction as follows:

- Impaling clips, accessories, and fasteners must be UL listed 40 UL18.24 UL Bld Mat Dir galvanized steel sheet or impaling bolts welded to each wall unit joint and spaced not more than 48 inches on center.

- Provide bar subgirts 1-1/2 by 1/8 inch galvanized steel with slotted holes for welding to end of impaling clip spikes.

- Provide galvanized steel structural angles and flashing angles, gage or thickness as indicated, or material as specified. Flashing angles must be not less than No. 18 U.S. standard gage.

Submit fire rating test report to contracting officer for review and approval. Secure written approval prior to commencement of installation.

2.7 UNDERLAYMENTS

2.7.1 Felt Underlayment

Provide No. 30 asphalt-saturated organic, non-perforated felt underlayment in compliance with ASTM D226/D226M, Type II, or ASTM D4869/D4869M.

2.7.2 Self-Adhering Sheet Membrane Underlayment

Provide self-adhering, cold-applied, composed of high-strength, embossed, slip-resistant, polyethylene film coated on one side with a layer of rubberized asphalt adhesive and interwound with a disposable release sheet.

2. Membrane Thickness: 40 mil.
3. Tensile Strength: 250 psi 1720 kN/m2
4. Elongation, Membrane: 250%.
5. Low Temperature Flexibility: Unaffected @ -20F.

2.7.3 Slip Sheet

Provide 5 pounds per 100 sf rosin sized unsaturated building paper for slip sheet.

2.8 GASKETS AND SEALING/INSULATING COMPOUNDS

Gaskets and sealing/insulating compounds must be nonabsorptive and suitable for insulating contact points of incompatible materials. Sealing/insulating compounds must be non-running after drying.

2.9 FINISH REPAIR MATERIAL

Only use repair and touch-up paint supplied by the roof panel manufacturer and is compatible with the specified system.
PART 3 EXECUTION

3.1 EXAMINATION

Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances, metal roof panel supports, and other conditions affecting performance of the work. Ensure surfaces are suitable, dry and free of defects and projections which might affect the installation.

Examine primary and secondary roof framing to verify that rafters, purlins, angels, channels, and other structural support members for panels and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer, UL, ASTM, and ASCE 7 requirements.

Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking; and that installation is within flatness tolerances required by metal roof panel manufacturer.

Examine rough-in for components and systems penetrating metal roof panels to verify actual locations of penetrations relative to seam locations of panels prior to installation.

Submit a written report to the Contracting Officer, endorsed by the installer, listing conditions detrimental to the performance of the work. Proceed with installation only after defects have been corrected.

3.2 INSTALLATION

Installation must meet specified requirements and be in accordance with the manufacturer's installation instructions and approved shop drawings. Do not install damaged materials. Dissimilar materials which are not compatible when contacting each other must be insulated by means of gaskets or sealing/insulating compounds. Keep all exposed surfaces and edges clean and free from sealant, metal cuttings, hazardous burrs, and other foreign material. Remove stained, discolored, or damaged materials from the site.

3.2.1 Preparation

Clean all substrate substances which may be harmful to insulation, and roof panels including removing projections capable of interfering with with insulation, and roof panel attachment.

Install sub-purlins, eave angles, furring, and other miscellaneous roof panel support members and anchorage according to metal roof panel manufacturer's written instructions.

3.2.2 Underlayment

Install underlayment according to roof panel manufacturer's written recommendations and recommendation in NRCA "The NRCA Roofing and Waterproofing Manual".

3.2.2.1 Self-Adhering Sheet Membrane Underlayment

Install self-adhering sheet underlayment; wrinkle free on roof deck. Comply with low-temperature installation restrictions of manufacturer where applicable. Install at locations indicated on project drawings, lapped in a direction to shed water. Lap sides not less than 3-1/2 inches. Lap ends
not less than 6 inches staggered 24 inches between courses. Roll laps with roller. Cover underlayment within seven days.

3.2.2.2 Slip Sheet

Apply specified slip sheet at time of roof panel installation when felt or other underlayment is used that may be in direct contact with and adhere to or adversely impact the underside of roof panels, and as otherwise recommended by the roof panel manufacturer.

3.3 INSULATION INSTALLATION

Install insulation concurrently with metal roof panel installation, in thickness indicated, to cover entire roof, according to manufacturer's written instructions.

3.4 PROTECTION OF APPLIED MATERIALS

Do not permit storing, walking, wheeling, and trucking directly on applied roofing/insulation materials. Provide temporary walkways, runways, and platforms of smooth clean boards or planks as necessary to avoid damage to applied roofing/insulation materials, and to distribute weight to conform to indicated live load limits of roof construction.

3.5 FASTENER INSTALLATION

Anchor metal roof panels and other components of the Work securely in place, using approved fasteners according to manufacturer's written instructions.

3.5.1 Welding

Procedures for manual, shielded metal-arc welding, the appearance and quality of welds made, and the methods used in correcting welding work must be in accordance with AWS D1.1/D1.1M.

3.6 FLASHING, TRIM, AND CLOSURE INSTALLATION

3.6.1 General Requirements

Comply with performance requirements, manufacturer's written installation instructions, and SMACNA 1793. Provide concealed fasteners where possible. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently water tight and weather resistant. Work is to be accomplished to form weather tight construction without waves, warps, buckles, fastening stresses or distortion, and to allow for expansion and contraction. Cutting, fitting, drilling, and other operations in connection with sheet metal required to accomplish the work must conform to the manufacturers written instructions.

3.6.2 Metal Flashing

Install exposed metal flashing at building corners, rakes, eaves, junctions between metal siding and roofing, valleys and changes off slope or direction in metal roofing, building expansion joints and gutters.

Exposed metal flashing must be the same material, color, and finish as the specified metal roofing panels. Furnish flashing in minimum 8 foot lengths. Exposed flashing must have 1 inch locked and blind soldered end
joints, with expansion joints at intervals of no greater than 16 feet.

Fasten flashing at not more than 8 inches on center for roofs, except where flashing is held in place by the same screws used to secure panels. Exposed flashing and flashing subject to rain penetration must be bedded in specified joint sealant. Flashing which is contact with dissimilar metals must be isolated by means of the specified asphalt mastic material to prevent electrolytic deterioration.

Form drips to the profile indicated, with the edge folded back 1/2 inch to form a reinforced drip edge.

3.7 ROOF PANEL INSTALLATION

Provide metal roof panels of full length from eave to ridge or eave to wall as indicated, unless otherwise indicated or restricted by shipping limitations. Anchor metal roof panels or other components of the Work securely in place, with provisions for thermal and structural movement in accordance with NRCA 0420.

Steel Roof Panels: Use stainless steel fasteners for exterior surfaces and galvanized fasteners for unexposed surfaces.

Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using approved fasteners according to manufacturer's written instructions. Provide all blocking and nailers as required.

Metal Protection: Where dissimilar metals contact each other or possibly corrosive substrates, protect against galvanic action by permanent separation as recommended by the metal roof panel manufacturer.

Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and required for weatherproof performance of metal roof panel system. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal roof panel manufacturer.

3.7.1 Handling and Erection

Erect roofing system in accordance with the approved erection drawings, printed instructions and safety precautions of the manufacturer.

Do not subject panels to overloading, abuse, or undue impact. Do not apply bent, chipped, or defective panels. Damaged panels must be replaced and removed from the site at the contractors expense. Erect panels true, plumb, and in exact alignment with the horizontal and vertical edges of the building, securely anchored, and with indicated rake, eave, and curb overhang. Allow for thermal movement of the roofing, movement of the building structure, and provide permanent freedom from noise due to wind pressure.

Do not permit storage, walking, wheeling or trucking directly on applied roofing materials. Provide temporary walkways, runways, and platforms of smooth clean boards or planks as necessary to avoid damage to the installed roofing materials, and to distribute weight to conform to the indicated live load limits of the roof construction.

Roof panels must be laid with corrugations in the direction of the roof slope. End laps of exterior roofing must not be less than 8 inches; side
laps of standard exterior corrugated panels must not be less than 2-1/2 corrugations.

Field cutting of metal roof panels by torch is not permitted. Field cut only as recommended by manufacturer's written instructions.

3.7.2 Closure Strips

Install metal closure strips at open ends of metal ridge rolls; open ends of corrugated or ribbed pattern roofs, and at intersection of wall and roof, unless open ends are concealed with formed eave flashing; rake of metal roof unless open end has a formed flashing member; and in other required areas.

Install closure strips at intersection of the wall with metal roofing; top and bottom of metal siding; heads of wall openings; and in other required locations.

3.7.3 Workmanship

Make lines, arises, and angles sharp and true. Free exposed surfaces from any visible wave, warp, buckle and tool marks. Fold back exposed edges neatly to form a 1/2 inch hem on the concealed side. Make sheet metal exposed to the weather watertight with provisions for expansion and contraction.

Make surfaces to receive sheet metal plumb and true, clean, even, smooth, dry, and free of defects and projections which might affect the application. For installation of items not shown in detail or not covered by specifications conform to the applicable requirements of SMACNA 1793. Provide sheet metal flashing in the angles formed where roof decks abut walls, curbs, ventilators, pipes, or other vertical surfaces and wherever indicated and as necessary to make the work watertight.

3.8 ACCEPTANCE PROVISIONS

3.8.1 Erection Tolerances

Erect metal roofing straight and true with plumb vertical lines correctly lapped and secured in accordance with the manufacturer's written instructions. Horizontal lines must not vary more than 1/8 inch in 40 feet.

3.8.2 Leakage Tests

Finished application of metal roofing is to be subject to inspection and test for leakage by the Contracting Officer or his designated representative, and Architect/Engineer. Inspection and tests will be conducted without cost to the Government.

Inspection and testing is to be made promptly after erection to permit correction of defects and removal/replacement of defective materials.

3.8.3 Repairs to Finish

Scratches, abrasions, and minor surface defects of finish may be repaired with the specified repair materials and as recommended by the metal roof panel manufacturer. Finished repaired surfaces must be uniform and free from variations of color and surface texture. Repaired metal surfaces that are not acceptable to the project requirements are to be immediately
removed and replaced with new material.

3.8.4 Paint Finished Metal Roofing

Paint finished metal roofing will be tested for color stability by the Contracting Officer during the manufacturer's specified guarantee period. Panels that indicate color changes, fading, or surface degradation, determined by visual examination, must be removed and replaced with new panels at no expense to the Government. New panels will be subject to the specified tests for an additional year from the date of their installation.

3.9 CLEAN UP AND DISPOSAL

Clean exposed sheet metal work at completion of installation. Remove metal shavings, filings, nails, bolts, and wires from roofs. Remove grease and oil films, excess sealants, handling marks, contamination from steel wool, fittings and drilling debris and scrub the work clean. Exposed metal surfaces must be free of dents, creases, waves, scratch marks, solder or weld marks, and damage to the finish coating. Touch up scratches in panel finish with manufacturer supplied touch-up paint system to match panel finish.

Collect all scrap/waste materials and place in containers. Promptly dispose of demolished and scrap materials. Do not allow scrap/waste materials to accumulate on-site; transport immediately from the government property and legally dispose of them.

3.10 FIELD QUALITY CONTROL

3.10.1 Manufacturer's Inspection

Manufacturer's technical representative must visit the site a minimum of three times during the installation for purposes of reviewing materials installation practices and adequacy of work in place. After each inspection, submit a report, signed by the manufacturer's technical representative to the Contracting Officer within 3 working days. Note in the report overall quality of work, deficiencies and any other concerns, and recommended corrective action.

Submit three signed copies of the manufacturer's field inspection reports to the Contracting Officer within one week of substantial completion.

3.11 INFORMATION CARD

For each roof, furnish a typewritten information card for facility records and a card laminated in plastic and framed for interior display at roof access point, or a photoengraved 0.032 inch thick aluminum card for exterior display.

Make card 8 1/2 by 11 inches minimum. Information card must identify facility name and number; location; contract number; approximate roof area; detailed roof system description, including deck type, roof panel manufacturer and product name, type underlayment(s), date of completion; installing contractor identification and contact information; manufacturer warranty expiration, warranty reference number, and contact information. Install card at location as directed by the Contracting Officer and provide a paper copy to the Contracting Officer.
3.12 USACE WARRANTY
CONTRACTOR'S TWENTY (20) YEAR NO PENAL SUM WARRANTY
FOR
NON-STRUCTURAL METAL ROOF SYSTEM

FACILITY DESCRIPTION___________________________________________________

BUILDING NUMBER:_____________________________________________________

CORPS OF ENGINEERS 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:___________________________________________________
CONTRACTOR'S TWENTY (20) YEAR NO PENAL SUM WARRANTY
FOR
NON-STRUCTURAL METAL ROOF SYSTEM
(continued)

THE NON-STRUCTURAL METAL ROOF 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 NON-STRUCTURAL METAL ROOFING SYSTEM COVERED UNDER
THIS WARRANTY SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO, THE FOLLOWING: THE
ENTIRE ROOFING SYSTEM, MANUFACTURER SUPPLIED FRAMING AND STRUCTURAL MEMBERS,
METAL ROOF PANELS, FASTENERS, CONNECTORS, ROOF SecureMENT COMPONENTS, AND
ASSEMBLIES TESTED AND APPROVED IN ACCORDANCE WITH UL 580. 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 FLASHING 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
NON-STRUCTURAL METAL ROOFING SYSTEM.

ALL MATERIAL DEFICIENCIES, WIND DAMAGE, STRUCTURAL FAILURE, AND LEAKAGE
ASSOCIATED WITH THE NON-STRUCTURAL METAL ROOF SYSTEM COVERED UNDER THIS
WARRANTY SHALL BE REPAIRED AS APPROVED BY THE CONTRACTING OFFICER. THIS
WARRANTY SHALL COVER THE ENTIRE COST OF REPAIR OR REPLACEMENT, INCLUDING ALL
MATERIAL, LABOR, AND RELATED MARKUPS. THE ABOVE REFERENCED WARRANTY
COMMENCED ON THE DATE OF FINAL ACCEPTANCE ON ____________________________ AND
WILL REMAIN IN EFFECT FOR STATED DURATION FROM THIS DATE.

SIGNED, DATED, AND NOTARIZED (BY COMPANY PRESIDENT)

____________________________________________________________
(Company President)                      (Date)
CONTRACTOR'S TWENTY (20) YEAR NO PENAL SUM WARRANTY
FOR
NON-STRUCTURAL METAL ROOFING SYSTEM
(continued)

THE CONTRACTOR MUST SUPPLEMENT THIS WARRANTY WITH WRITTEN WARRANTIES FROM THE
MANUFACTURER AND/OR INSTALLER OF THE NON-STRUCTURAL METAL ROOFING
SYSTEM. SUBMIT ALONG WITH THE CONTRACTOR’S WARRANTY. HOWEVER, THE CONTRACTOR
IS 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 NON-STRUCTURAL METAL ROOF DUE TO ACTIONS BY
THE OWNER TO INHIBIT FREE DRAINAGE OF WATER FROM THE ROOF AND GUTTERS AND
DOWNSPOUTS OR ALLOW PONDING WATER TO COLLECT ON THE ROOF SURFACE.
CONTRACTOR'S DESIGN MUST INSURE FREE DRAINAGE FROM THE ROOF AND NOT ALLOW
PONDING WATER.

6. THIS WARRANTY APPLIES TO THE NON-STRUCTURAL METAL ROOFING SYSTEM. IT
DOES NOT INCLUDE ANY CONSEQUENTIAL DAMAGE TO THE BUILDING INTERIOR OR
CONTENTS WHICH IS COVERED BY THE WARRANTY OF CONSTRUCTION CLAUSE INCLUDED IN
THIS CONTRACT.

7. THIS WARRANTY CANNOT BE TRANSFERRED TO ANOTHER OWNER WITHOUT WRITTEN
CONSENT OF THE CONTRACTOR; AND THIS WARRANTY AND THE CONTRACT PROVISIONS WILL
TAKE PRECEDENCE OVER ANY CONFLICTS WITH STATE STATUTES.
CONTRACTOR'S TWENTY (20) YEAR NO PENAL SUM WARRANTY
FOR NON-STRUCTURAL METAL ROOF SYSTEM

(continued)

**REPORTS OF LEAKS AND ROOF SYSTEM DEFICIENCIES MUST BE RESPONDED TO WITHIN 48 HOURS OF RECEIPT OF NOTICE, BY TELEPHONE OR IN WRITING, FROM EITHER THE OWNER OR CONTRACTING OFFICER. INITIATE EMERGENCY REPAIRS TO PREVENT FURTHER ROOF LEAKS IMMEDIATELY; SUBMIT A WRITTEN PLAN FOR APPROVAL TO REPAIR OR REPLACE THIS ROOF SYSTEM WITHIN SEVEN (7) CALENDAR DAYS. COMMENCE ACTUAL WORK FOR PERMANENT REPAIRS OR REPLACEMENT 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 NON-STRUCTURAL METAL ROOF SYSTEM REPAIRED OR REPLACED BY OTHERS AND CHARGE THE COST TO THE CONTRACTOR.


POST A FRAMED COPY OF THIS WARRANTY IN THE MECHANICAL ROOM OR OTHER APPROVED LOCATION DURING THE ENTIRE WARRANTY PERIOD.

-- End of Section --
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)


AMERICAN WELDING SOCIETY (AWS)

AWS D1.2/D1.2M (2014) Structural Welding Code - Aluminum

ASTM INTERNATIONAL (ASTM)


ASTM A653/A653M (2017) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process


1.2 GENERAL REQUIREMENTS

Finished sheet metal assemblies must form a weathertight enclosure without waves, warps, buckles, fastening stresses or distortion, while allowing for expansion and contraction without damage to the system. The sheet metal installer is responsible for cutting, fitting, drilling, and other operations in connection with sheet metal modifications required to accommodate the work of other trades. Coordinate installation of sheet metal items used in conjunction with roofing with roofing work to permit continuous, uninterrupted roofing operations.

1.3 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. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings
Exposed Sheet Metal Coverings; G
1.4 MISCELLANEOUS REQUIREMENTS

1.4.1 Product Data

Indicate thicknesses, dimensions, fastenings, anchoring methods, expansion joints, and other provisions necessary for thermal expansion and contraction. Scaled manufacturer's catalog data may be submitted for factory fabricated items.

1.4.2 Finish Samples

Submit two color charts and two finish sample chips from manufacturer's standard color and finish options for each type of finish indicated.

1.4.3 Operation and Maintenance Data

Submit detailed instructions for installation and quality control during installation, cleaning and maintenance, for each type of assembly indicated.

1.5 DELIVERY, HANDLING, AND STORAGE

Package and protect materials during shipment. Uncrate and inspect
materials for damage, dampness, and wet-storage stains upon delivery to the job site. Remove from the site and replace damaged materials that cannot be restored to like-new condition. Handle sheet metal items to avoid damage to surfaces, edges, and ends. Store materials in dry, weather-tight, ventilated areas until installation.

PART 2 PRODUCTS

2.1 RECYCLED CONTENT

Provide products with recycled content and provide certificates of compliance in accordance with Section 01 33 29 SUSTAINABILITY REPORTING.

2.2 MATERIALS

Do not use lead, lead-coated metal, or galvanized steel. Use any metal listed by SMACNA 1793 for a particular item, unless otherwise indicated. Provide materials, thicknesses, and configurations in accordance with SMACNA 1793 for each material. Different items need not be of the same metal, except that contact between dissimilar metals must be avoided.

Furnish sheet metal items in 8 to 10 foot lengths. Single pieces less than 8 feet long may be used to connect to factory-fabricated inside and outside corners, and at ends of runs. Factory fabricate corner pieces with minimum 12 inch legs. Provide accessories and other items essential to complete the sheet metal installation. Provide accessories made of the same or compatible materials as the items to which they are applied. Fabricate sheet metal items of the materials specified below and to the gage, thickness, or weight shown in Table I at the end of this section. Provide sheet metal items with mill finish unless specified otherwise. Where more than one material is listed for a particular item in Table I, each is acceptable and may be used, except as follows:

2.2.1 Exposed Sheet Metal Items

Must be of the same material. Consider the following as exposed sheet metal: gutters, including hangers; downspouts; flashings and related accessories.

2.2.2 Drainage

Do not use copper for an exposed item if drainage from that item will pass over exposed masonry, stonework or other metal surfaces. In addition to the metals listed in Table I, lead-coated copper may be used for such items.

2.2.3 Lead Sheet

Provide in a minimum weight of 4 pounds per square foot.

2.2.4 Steel Sheet, Zinc-Coated (Galvanized)

Provide in accordance with ASTM A653/A653M.

2.2.5 Zinc Sheet and Strip

Provide in accordance with ASTM B69, Type I, a minimum of 0.024 inch thick.
2.2.6 Stainless Steel

Provide in accordance with ASTM A480/A480M, Type 302 or 304, 2D Finish, fully annealed, dead-soft temper.

2.2.7 Aluminum Alloy Sheet and Plate

Provide in accordance with ASTM B209 form alloy, and temper appropriate for use.

2.2.7.1 Alclad

When fabricated of aluminum, fabricate the following items with Alclad 3003, Alclad 3004, or Alclad 3005, clad on one side unless otherwise indicated.

a. Gutters, downspouts, and hangers

b. Flashing

2.2.8 Finishes

Provide exposed exterior sheet metal and aluminum with a baked on, factory applied color coating of polyvinylidene fluoride (PVF2) or approved equal fluorocarbon coating. Dry film thickness of coatings must be 0.8 to 1.3 mils. Color to be selected from manufacturer's full range of "cool roof" color choices. Field applications of color coatings are prohibited and will be rejected.

2.2.9 Cool Roof Finishes

Provide cool roof finish coatings and colors in accordance with one of the following methods of analysis:

2.2.9.1 Energy Star Certification

Provide roof finishes having an initial solar reflectance of 0.65 for low slope roofs with a 2:12 pitch or less when tested in accordance with ASTM E1918 and ASTM E1980 or as certified by Energy Star for the particular product proposed. Certified Energy Star roof products are listed at https://www.energystar.gov/productfinder/product/certified-roof-products/results

2.2.9.2 ASHRAE 189.1 (2011) Compliance

Provide roof finishes having a minimum initial Solar Reflectance Index of 78 for low slope roofs with a 2:12 pitch or less when tested in accordance with ASTM E1918 and ASTM E1980, to comply with ASHRAE 189.1.

2.2.9.3 ASHRAE 90.1 (2010) Compliance

Provide roof finishes having a minimum 3-year aged solar reflectance of 0.55 when tested in accordance with ASTM C1549 or ASTM E1918, and a minimum 3-year aged thermal emittance of 0.75 when tested in accordance with ASTM E971 or ASTM E408, or, a minimum 3-year aged Solar Reflectance Index of 64 when determined in accordance with the Solar Reflectance Index method in ASTM E1980 using a convection coefficient of 2.1 BTU per h ft2, to comply with ASHRAE 90.1 - IP.
2.2.10 Aluminum Alloy, Extruded Bars, Rods, Shapes, and Tubes

ASTM B221.

2.2.11 Solder

Provide in accordance with ASTM B32, 95-5 tin-antimony.

2.2.12 Splash Pans

Provide splash pans where downspouts discharge onto roof surfaces and at locations indicated. Unless otherwise indicated, provide pans not less than 24 inches long by 18 inches wide with metal ribs across bottoms of pans. Provide sides of pans with vertical baffles not less than one inch high in the front, and 4 inches high in the back.

2.2.13 Bituminous Plastic Cement

Provide in accordance with ASTM D4586/D4586M, Type I.

2.2.14 Fasteners

Use the same metal as, or a metal compatible with the item fastened. Confirm compatibility of fasteners and items to be fastened to avoid galvanic corrosion due to dissimilar materials.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Workmanship

Make lines and angles sharp and true. Free exposed surfaces from visible wave, warp, buckle, and tool marks. Fold back exposed edges neatly to form a 1/2 inch hem on the concealed side. Make sheet metal exposed to the weather watertight with provisions for expansion and contraction.

Make surfaces to receive sheet metal plumb and true, clean, even, smooth, dry, and free of defects and projections. For installation of items not shown in detail or not covered by specifications conform to the applicable requirements of SMACNA 1793, Architectural Sheet Metal Manual. Provide sheet metal flashing in the angles formed where roof decks abut walls, curbs, ventilators, pipes, or other vertical surfaces and wherever indicated and necessary to make the work watertight. Join sheet metal items together as shown in Table II.

3.1.2 Nailing

Confine nailing of sheet metal generally to sheet metal having a maximum width of 18 inches. Confine nailing of flashing to one edge only. Space nails evenly not over 3 inch on center and approximately 1/2 inch from edge unless otherwise specified or indicated. Face nailing will not be permitted. Where sheet metal is applied to other than wood surfaces, include in shop drawings, the locations for sleepers and nailing strips required to secure the work.

3.1.3 Cleats

Provide cleats for sheet metal 18 inches and over in width. Space cleats
evenly not over 12 inches on center unless otherwise specified or indicated. Unless otherwise specified, provide cleats of 2 inches wide by 3 inches long and of the same material and thickness as the sheet metal being installed. Secure one end of the cleat with two nails and the cleat folded back over the nailheads. Lock the other end into the seam. Where the fastening is to be made to concrete or masonry, use screws and drive in expansion shields set in concrete or masonry. Pre-tin cleats for soldered seams.

3.1.4 Bolts, Rivets, and Screws

Install bolts, rivets, and screws where indicated or required. Provide compatible washers where required to protect surface of sheet metal and to provide a watertight connection. Provide mechanically formed joints in aluminum sheets 0.040 inches or less in thickness.

3.1.5 Soldering

Where soldering is specified, apply to copper, terne-coated stainless steel, zinc-coated steel, and stainless steel items. Pre-tin edges of sheet metal before soldering is begun. Seal the joints in aluminum sheets of 0.040 inch or less in thickness with specified sealants. Do not solder aluminum.

3.1.5.1 Edges

Scrape or wire-brush the edges of lead-coated material to be soldered to produce a bright surface. Flux brush the seams in before soldering. Treat with soldering acid flux the edges of stainless steel to be pre-tinned. Seal the joints in aluminum sheets of 0.040 inch or less in thickness with specified sealants. Do not solder aluminum.

3.1.6 Welding and Mechanical Fastening

Use welding for aluminum of thickness greater than 0.040 inch. Aluminum 0.040 inch or less in thickness must be butted and the space backed with formed flashing plate; or lock joined, mechanically fastened, and filled with sealant as recommended by the aluminum manufacturer.

3.1.6.1 Welding of Aluminum

Use welding of the inert gas, shield-arc type. For procedures, appearance and quality of welds, and the methods used in correcting welding work, conform to AWS D1.2/D1.2M.

3.1.6.2 Mechanical Fastening of Aluminum

Use No. 12, aluminum alloy, sheet metal screws or other suitable aluminum alloy or stainless steel fasteners. Drive fasteners in holes made with a No. 26 drill in securing side laps, end laps, and flashings. Space fasteners 12 inches maximum on center. Where end lap fasteners are required to improve closure, locate the end lap fasteners not more than 2 inches from the end of the overlapping sheet.

3.1.7 Protection from Contact with Dissimilar Materials

3.1.7.1 Aluminum

Do not allow aluminum surfaces in direct contact with other metals except...
stainless steel, zinc, or zinc coating. Where aluminum contacts another metal, paint the dissimilar metal with a primer followed by two coats of aluminum paint. Where drainage from a dissimilar metal passes over aluminum, paint the dissimilar metal with a non-lead pigmented paint.

3.1.7.2 Metal Surfaces

Paint surfaces in contact with mortar, concrete, or other masonry materials with alkali-resistant coatings such as heavy-bodied bituminous paint.

3.1.7.3 Wood or Other Absorptive Materials

Paint surfaces that may become repeatedly wet and in contact with metal with two coats of aluminum paint or a coat of heavy-bodied bituminous paint.

3.1.8 Expansion and Contraction

Provide expansion and contraction joints at not more than 32 foot intervals for aluminum and at not more than 40 foot intervals for other metals. Provide an additional joint where the distance between the last expansion joint and the end of the continuous run is more than half the required interval. Space joints evenly. Join extruded aluminum gravel stops and fasciae by expansion and contraction joints spaced not more than 12 feet apart.

3.1.9 Gutters

The hung type of shape indicated and supported on underside by brackets that permit free thermal movement of the gutter. Provide gutters in sizes indicated complete with mitered corners, end caps, outlets, brackets, and other accessories necessary for installation. Bead with hemmed edge or reinforce the outer edge of gutter with a stiffening bar not less than 3/4 by 3/16 inch of material compatible with gutter. Fabricate gutters in sections not less than 8 feet. Lap the sections a minimum of one inch in the direction of flow or provide with concealed splice plate 6 inches minimum. Join the gutters, other than aluminum, by riveted and soldered joints. Join aluminum gutters with riveted sealed joints. Provide expansion-type slip joints midway between outlets. Install gutters below slope line of the roof so that snow and ice can slide clear. Support gutters as indicated spaced not less than 36 inches apart. Adjust gutters to slope uniformly to outlets, with high points occurring midway between outlets. Fabricate hangers and fastenings from compatible metals.

3.1.10 Downspouts

Space supports for downspouts according to the manufacturer's recommendation for the steel substrate. Types, shapes and sizes are indicated. Provide complete including elbows and offsets. Provide downspouts in approximately 10 foot lengths. Provide end joints to telescope not less than 1/2 inch and lock longitudinal joints. Provide gutter outlets with wire ball strainers for each outlet. Provide strainers to fit tightly into outlets and be of the same material used for gutters. Keep downspouts not less than one inch away from walls. Fasten to the walls at top, bottom, and at an intermediate point not to exceed 5 feet on center with leader straps or concealed rack-and-pin type fasteners. Form straps and fastenings of metal compatible with the downspouts.
3.1.10.1 Terminations

Neatly fit into the drainage connection the downspouts terminating in drainage lines and fill the joints with a portland cement mortar cap sloped away from the downspout. Provide downspouts terminating in splash blocks with elbow-type fittings. Provide splash pans as specified.

3.1.11 Flashing for Roof Drains

Provide a 30 inches square sheet indicated. Taper insulation to drain from 24 inches out. Set flashing on finished felts in a full bed of asphalt roof cement, ASTM D4586/D4586M. Heavily coat the drain flashing ring with asphalt roof cement. Clamp the roof membrane, flashing sheet, and stripping felt in the drain clamping ring. Secure clamps so that felts and drain flashing are free of wrinkles and folds. Retrofit roof drains must conform to ANSI/SPRI RD-1.

3.1.12 Splash Pans

Install splash pans lapped with horizontal roof flanges not less than 4 inches wide to form a continuous surface. Bend the rear flange of the pan to contour of can't strip and extend up 6 inches under the side wall covering or to height of base flashing under counterflashing. Bed the pans and roof flanges in plastic bituminous cement and strip-flash as specified.

3.1.13 Sheet Metal Covering on Flat, Sloped, or Curved Surfaces

Except as specified or indicated otherwise, cover and flash all minor flat, sloped, or curved surfaces such as cricket, bulkheads, dormers and small decks with metal sheets of the material used for flashing; maximum size of sheets, 16 by 18 inches. Fasten sheets to sheathing with metal cleats. Lock seams and solder. Lock aluminum seams as recommended by aluminum manufacturer. Provide an underlayment of roofing felt for all sheet metal covering.

3.1.14 Flashing at Roof Penetrations and Equipment Supports

Provide metal flashing for all pipes, ducts, and conduits projecting through the roof surface and for equipment supports, guy wire anchors, and similar items supported by or attached to the roof deck.

3.1.15 Single Pipe Vents

See Table I, footnote (d). Set flange of sleeve in bituminous plastic cement and nail 3 inches on center. Bend the top of sleeve over and extend down into the vent pipe a minimum of 2 inches. For long runs or long rises above the deck, where it is impractical to cover the vent pipe with lead, use a two-piece formed metal housing. Set metal housing with a metal sleeve having a 4 inches roof flange in bituminous plastic cement and nailed 3 inches on center. Extend sleeve a minimum of 8 inches above the roof deck and lapped a minimum of 3 inches by a metal hood secured to the vent pipe by a draw band. Seal the area of hood in contact with vent pipe with an approved sealant.

3.1.16 Stepped Flashing

Provide stepped flashing where sloping roofs surfaced with shingles abut vertical surfaces. Place separate pieces of base flashing in alternate shingle courses.
3.2 PAINTING

Touch ups in the field may be applied only after metal substrates have been cleaned and pretreated in accordance with manufacturer's written instructions and products.

Field-paint sheet metal for separation of dissimilar materials.

3.2.1 Aluminum Surfaces

Clean with solvent and apply one coat of zinc-molybdate primer and one coat of aluminum paint.

3.3 CLEANING

Clean exposed sheet metal work at completion of installation. Remove grease and oil films, handling marks, contamination from steel wool, fittings and drilling debris, and scrub-clean. Free the exposed metal surfaces of dents, creases, waves, scratch marks, and solder or weld marks.

3.4 REPAIRS TO FINISH

Scratches, abrasions, and minor surface defects of finish may be repaired in accordance with the manufacturer's printed instructions and as approved. Repair damaged surfaces caused by scratches, blemishes, and variations of color and surface texture. Replace items which cannot be repaired.

3.5 FIELD QUALITY CONTROL

Establish and maintain a Quality Control Plan for sheet metal used in conjunction with roofing to assure compliance of the installed sheet metalwork with the contract requirements. Remove work that is not in compliance with the contract and replace or correct. Include quality control, but not be limited to, the following:

a. Observation of environmental conditions; number and skill level of sheet metal workers; condition of substrate.

b. Verification that specified material is provided and installed.

c. Inspection of sheet metalwork, for proper size(s) and thickness(es), fastening and joining, and proper installation.

3.5.1 Procedure

Submit for approval prior to start of roofing work. Include a checklist of points to be observed. Document the actual quality control observations and inspections. Furnish a copy of the documentation to the Contracting Officer at the end of each day.
<table>
<thead>
<tr>
<th>Sheet Metal Items</th>
<th>Aluminum, inch</th>
<th>Stainless Steel, inch</th>
<th>Zinc-Coated Steel, U.S. Std. Gage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Building Expansion Joints</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Covering on minor flat, pitched</td>
<td>.040</td>
<td>.018</td>
<td></td>
</tr>
<tr>
<td>or curved surfaces</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Downspouts and leaders</td>
<td>.032</td>
<td>.015</td>
<td>24</td>
</tr>
<tr>
<td>Downspout clips and anchors</td>
<td>.040 clip</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>.125 anchor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Downspout straps, 2-inch</td>
<td>.060</td>
<td>.050</td>
<td>-</td>
</tr>
<tr>
<td>Strainers, wire diameter or gage</td>
<td>.144 diameter</td>
<td>.109 diameter</td>
<td></td>
</tr>
<tr>
<td><strong>Flashings:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roof drain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pipe vent sleeve (d)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gutters:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gutter section</td>
<td>.032</td>
<td>.015</td>
<td>24</td>
</tr>
<tr>
<td>Continuous cleat</td>
<td>.032</td>
<td>.015</td>
<td>24</td>
</tr>
<tr>
<td>Hangers, dimensions</td>
<td>1 inch by .080</td>
<td>1 inch by .80 inch</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>inch (c)</td>
<td>inch</td>
<td></td>
</tr>
<tr>
<td>Joint Cover plates (See Table II)</td>
<td>.032</td>
<td>.015</td>
<td>24</td>
</tr>
<tr>
<td>Splash pans</td>
<td>.040</td>
<td>.018</td>
<td>-</td>
</tr>
</tbody>
</table>

(a) Brass.

(b) May be lead weighing 4 pounds per square foot.

(c) May be polyvinyl chloride.
### TABLE I. SHEET METAL WEIGHTS, THICKNESSES, AND GAGES

<table>
<thead>
<tr>
<th>Sheet Metal Items</th>
<th>Aluminum, inch</th>
<th>Stainless Steel, inch</th>
<th>Zinc-Coated Steel, U.S. Std. Gage</th>
</tr>
</thead>
<tbody>
<tr>
<td>(d) 2.5 pound minimum lead sleeve with 4 inch flange. Where lead sleeve is impractical, refer to paragraph SINGLE PIPE VENTS for optional material.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TABLE II. SHEET METAL JOINTS

<table>
<thead>
<tr>
<th>TYPE OF JOINT</th>
<th>Item Designation</th>
<th>Zinc-Coated Steel and Stainless Steel</th>
<th>Aluminum</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joint cap for building expansion seam, cleated joint at roof</td>
<td>1.25 inch single lock, standing seam, cleated</td>
<td>1.25 inch single lock, standing</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Gutters</td>
<td>1.5 inch lap, riveted and soldered</td>
<td>One inch flat locked riveted and sealed</td>
<td>Aluminum producers recommended hard setting sealant for locked aluminum joints.</td>
<td></td>
</tr>
</tbody>
</table>

-- End of Section --
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 C734   (2015) Low-Temperature Flexibility of Latex Sealants After Artificial Weathering

ASTM C919   (2012; R 2017) Standard Practice for Use of Sealants in Acoustical Applications


CALIFORNIA DEPARTMENT OF PUBLIC HEALTH (CDPH)

CDPH SECTION 01350 Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers

SCIENTIFIC CERTIFICATION SYSTEMS (SCS)

SCS   SCS Global Services (SCS) Indoor Advantage
1.2 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. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data
   Sealants; G
   Primers; G
   Bond Breakers; G
   Backstops; G

SD-06 Test Reports
   Field Adhesion; G

SD-07 Certificates
   Indoor Air Quality; G

SD-11 Closeout Submittals
   Indoor Air Quality For Interior Sealants; S
   Indoor Air Quality For Interior Floor Joint Sealants; S
   Indoor Air Quality For Interior Acoustical Sealants; S
   Indoor Air Quality For Interior Caulking; S

1.3 PRODUCT DATA

Include storage requirements, shelf life, curing time, instructions for mixing and application, and accessories. Provide manufacturer's Safety Data Sheets (SDS) for each solvent, primer and sealant material proposed.
1.4 CERTIFICATIONS

1.4.1 Indoor Air Quality Certifications

Submit required indoor air quality certifications in one submittal package.

1.4.1.1 Adhesives and Sealants

Provide products certified to meet indoor air quality requirements by UL 2818 (Greenguard) Gold, SCS Global Services Indoor Advantage Gold or provide validation by other third-party program that products meet the requirements of this paragraph. Sealants and non-aerosol adhesive products used on the interior of the building (defined as inside of the weatherproofing system) must meet either emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type) or VOC content requirements of SCAQMD Rule 1168. Provide current product certification documentation from certification body.

1.5 ENVIRONMENTAL CONDITIONS

Apply sealant when the ambient temperature is between 40 and 90 degrees F.

1.6 DELIVERY AND STORAGE

Deliver materials to the jobsite in unopened manufacturers' sealed shipping containers, with brand name, date of manufacture, color, and material designation clearly marked thereon. Label elastomeric sealant containers to identify type, class, grade, and use. Handle and store materials in accordance with manufacturer's printed instructions. Prevent exposure to foreign materials or subjection to sustained temperatures exceeding 90 degrees F or lower than 0 degrees F. Keep materials and containers closed and separated from absorptive materials such as wood and insulation.

1.7 QUALITY ASSURANCE

1.7.1 Compatibility with Substrate

Verify that each sealant is compatible for use with each joint substrate in accordance with sealant manufacturer's printed recommendations for each application.

1.7.2 Joint Tolerance

Provide joint tolerances in accordance with manufacturer's printed instructions.

1.7.3 Mock-Up

Provide a mock-up of each type of sealant using materials, colors, and techniques approved for use on the project. Approved mock-ups may be incorporated into the Work.

1.7.4 Adhesion

Provide in accordance with ASTM C1193 or ASTM C1521.
PART 2   PRODUCTS

2.1  PRODUCT SUSTAINABILITY CRITERIA

For products in this section, where applicable and to extent allowed by performance criteria, provide and document the following:

2.1.1  Reduce Volatile Organic Compounds (VOC) (Low-Emitting Materials) for Products

Reduced VOC content is identified for some products in this section; provide documentation in accordance with Section 01 33 29 SUSTAINABILITY REPORTING paragraph REDUCE VOLATILE ORGANIC COMPOUNDS (VOC) (LOW-EMITTING MATERIALS). Other products listed in this section may be available with reduced VOC content; identify those products that meet project requirements for reduced VOC content, and provide documentation in accordance with Section 01 33 29 SUSTAINABILITY REPORTING paragraph REDUCE VOLATILE ORGANIC COMPOUNDS (VOC) (LOW-EMITTING MATERIALS).

2.2  SEALANTS

Provide sealant products that have been tested, found suitable, and documented as such by the manufacturer for the particular substrates to which they will be applied.

2.2.1  Interior Sealants

Provide ASTM C920, Type S or M, Grade NS, Class 12.5, Use NT. Provide certification of indoor air quality for interior sealants. Location(s) and color(s) of sealant for the following. Note, color "as selected" refers to manufacturer's full range of color options.

<table>
<thead>
<tr>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>As selected</td>
</tr>
<tr>
<td>a. Small voids between walls or partitions and adjacent casework, shelving, door frames, built-in or surface mounted equipment and fixtures, and similar items.</td>
</tr>
<tr>
<td>b. Perimeter of frames at doors, windows, and access panels which adjoin exposed interior concrete and masonry surfaces.</td>
</tr>
<tr>
<td>c. Joints of interior masonry walls and partitions which adjoin columns, pilasters, concrete walls, and exterior walls unless otherwise detailed.</td>
</tr>
<tr>
<td>d. Joints between edge members for acoustical tile and adjoining vertical surfaces.</td>
</tr>
<tr>
<td>e. Interior locations, not otherwise indicated or specified, where small voids exist between materials specified to be painted.</td>
</tr>
<tr>
<td>f. Joints formed where non-planar tile surfaces meet.</td>
</tr>
</tbody>
</table>
2.2.2 Exterior Sealants

For joints in vertical surfaces, provide ASTM C920, Type S or M, Grade NS, Class 25, Use NT. For joints in horizontal surfaces, provide ASTM C920, Type S or M, Grade P, Class 25, Use T. Provide location(s) and color(s) of sealant as follows. Note, color "as selected" refers to manufacturer's full range of color options:

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>COLOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Joints and recesses formed where frames and subsills of windows, doors, louvers, and vents adjoin masonry, concrete, or metal frames. Use sealant at both exterior and interior surfaces of exterior wall penetrations.</td>
<td>Match adjacent surface color</td>
</tr>
<tr>
<td>b. Joints between exterior masonry walls.</td>
<td>Match adjacent surface color</td>
</tr>
<tr>
<td>c. Masonry joints where shelf angles occur.</td>
<td>Match adjacent surface color</td>
</tr>
<tr>
<td>e. Expansion and control joints.</td>
<td>Match adjacent surface color</td>
</tr>
<tr>
<td>d. Voids where items pass through exterior walls.</td>
<td>Match adjacent surface color</td>
</tr>
<tr>
<td>e. Metal-to-metal joints where sealant is indicated or specified.</td>
<td>Match adjacent surface color</td>
</tr>
</tbody>
</table>

2.2.3 Floor Joint Sealants

ASTM C920, Type S or M, Grade P, Class 25, Use T. Provide certification of indoor air quality for interior floor joint sealants. Provide location(s) and color(s) of sealant as follows. Note, color "as selected" refers to manufacturer's full range of color options:

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>COLOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2.3 Floor Joint Sealants</td>
<td>As selected</td>
</tr>
</tbody>
</table>
2.2.4 Acoustical Sealants

Rubber or polymer based acoustical sealant in accordance with ASTM C919 to have a flame spread of 25 or less and a smoke developed rating of 50 or less when tested in accordance with ASTM E84. Provide non-staining acoustical sealant with a consistency of 250 to 310 when tested in accordance with ASTM D217. Acoustical sealant must remain flexible and adhesive after 500 hours of accelerated weathering as specified in ASTM C734. Provide certification of indoor air quality for interior acoustical sealants.

2.2.5 Preformed Sealants

Provide preformed sealants of polybutylene or isoprene-butylene based pressure sensitive weather resistant tape or bead sealants capable of sealing out moisture, air and dust when installed as recommended by the manufacturer. At temperatures from minus 30 to plus 160 degrees F, seala

2.3 PRIMERS

Non-staining, quick drying type and consistency as recommended by the sealant manufacturer for the particular application. Provide primers for interior applications that meet the indoor air quality requirements of the paragraph SEALANTS above.

2.4 BOND BREAKERS

Type and consistency as recommended by the sealant manufacturer to prevent adhesion of the sealant to the backing or to the bottom of the joint. Provide bond breakers for interior applications that meet the indoor air quality requirements of the paragraph SEALANTS above.

2.5 BACKSTOPS

Provide glass fiber roving, neoprene, butyl, polyurethane, or polyethylene foams free from oil or other staining elements as recommended by sealant manufacturer. Provide 25 to 33 percent oversized backing for closed cell and 40 to 50 percent oversized backing for open cell material, unless otherwise indicated. Provide backstop material that is compatible with sealant. Do not use oakum or other types of absorptive materials as backstops.

2.6 CAULKING

For interior use and only where there is little or no anticipated joint movement. Provide in accordance with ASTM D2452 and ASTM D2453. Provide certification of indoor air quality for interior caulking. Comply with requirements specified in Section 07 60 00 - Joint Sealants.

2.7 CLEANING SOLVENTS

Provide type(s) recommended by the sealant manufacturer and in accordance with environmental requirements herein. Protect adjacent aluminum
surfaces from solvents. Provide solvents for interior applications that meet the indoor air quality requirements of the paragraph SEALANTS above.

PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL

Perform a field adhesion test in accordance with manufacturer's instructions and ASTM C1193, Method A or ASTM C1521, Method A, Tail Procedure. Remove sealants that fail adhesion testing; clean substrates, reapply sealants, and re-test. Test sealants adjacent to failed sealants. Submit field adhesion test report indicating tests, locations, dates, results, and remedial actions taken.

3.2 SURFACE PREPARATION

Prepare surfaces according to manufacturer's printed installation instructions. Clean surfaces from dirt, frost, moisture, grease, oil, wax, lacquer, paint, or other foreign matter that would destroy or impair adhesion. Remove oil and grease with solvent; thoroughly remove solvents prior to sealant installation. Wipe surfaces dry with clean cloths. When resealing an existing joint, remove existing caulk or sealant prior to applying new sealant. For surface types not listed below, provide in accordance with sealant manufacturer's printed instructions for each specific surface.

3.2.1 Steel Surfaces

Remove loose mill scale by sandblasting or, if sandblasting is impractical or would damage finished work, scraping and wire brushing. Remove protective coatings by sandblasting or using a residue free solvent. Remove resulting debris and solvent residue prior to sealant installation.

3.2.2 Aluminum or Bronze Surfaces

Remove temporary protective coatings from surfaces that will be in contact with sealant. When masking tape is used as a protective coating, remove tape and any residual adhesive prior to sealant application. For removing protective coatings and final cleaning, use non-staining solvents recommended by the manufacturer of the item(s) containing aluminum or bronze surfaces.

3.2.3 Concrete and Masonry Surfaces

Where surfaces have been treated with curing compounds, oil, or other such materials, remove materials by sandblasting or wire brushing. Remove laitance, efflorescence and loose mortar from the joint cavity. Remove resulting debris prior to sealant installation.

3.2.4 Wood Surfaces

Ensure wood surfaces that will be in contact with sealants are free of splinters, sawdust and other loose particles.

3.3 SEALANT PREPARATION

Do not add liquids, solvents, or powders to sealants. Mix multicomponent elastomeric sealants in accordance with manufacturer's printed instructions.
3.4 APPLICATION

3.4.1 Joint Width-To-Depth Ratios

Acceptable Ratios:

<table>
<thead>
<tr>
<th>JOINT WIDTH</th>
<th>JOINT DEPTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>Maximum</td>
</tr>
</tbody>
</table>

For metal, glass, or other nonporous surfaces:

<table>
<thead>
<tr>
<th>JOINT WIDTH</th>
<th>JOINT DEPTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>Maximum</td>
</tr>
</tbody>
</table>

| 1/4 inch (minimum)   | 1/4 inch                  |
| over 1/4 inch        | 1/2 of width              |
|                      | Equal to width            |

For wood, concrete, masonry:

<table>
<thead>
<tr>
<th>JOINT WIDTH</th>
<th>JOINT DEPTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>Maximum</td>
</tr>
</tbody>
</table>

| 1/4 inch (minimum)   | 1/4 inch                  |
| over 1/4 inch to 1/2 inch | 1/4 inch               |
| over 1/2 inch to 1 inch | 1/2 inch                |
| Over 1 inch          | prohibited                |

Unacceptable Ratios: Where joints of acceptable width-to-depth ratios have not been provided, clean out joints to acceptable depths and grind or cut to acceptable widths without damage to the adjoining work. Grinding is prohibited at metal surfaces.

3.4.2 Unacceptable Sealant Use

Do not install sealants in lieu of other required building enclosure weatherproofing components such as flashing, drainage components, and joint closure accessories, or to close gaps between walls, floors, roofs, windows, and doors, that exceed acceptable installation tolerances. Remove sealants that have been used in an unacceptable manner and correct building enclosure deficiencies to comply with contract documents requirements.

3.4.3 Masking Tape

Place masking tape on the finished surface on one or both sides of joint cavities to protect adjacent finished surfaces from primer or sealant smears. Remove masking tape within 10 minutes of joint filling and tooling.

3.4.4 Backstops

Provide backstops dry and free of tears or holes. Tightly pack the back or bottom of joint cavities with backstop material to provide joints in specified depths. Provide backstops where indicated and where backstops are not indicated but joint cavities exceed the acceptable maximum depths specified in JOINT WIDTH-TO-DEPTH RATIOS Table.

3.4.5 Primer

Clean out loose particles from joints immediately prior to application of.
Apply primer to joints in concrete masonry units, wood, and other porous surfaces in accordance with sealant manufacturer's printed instructions. Do not apply primer to exposed finished surfaces.

3.4.6 Bond Breaker

Provide bond breakers to surfaces not intended to bond in accordance with, sealant manufacturer's printed instructions for each type of surface and sealant combination specified.

3.4.7 Sealants

Provide sealants compatible with the material(s) to which they are applied. Do not use a sealant that has exceeded its shelf life or has jelled and cannot be discharged in a continuous flow from the sealant gun. Apply sealants in accordance with the manufacturer's printed instructions with a gun having a nozzle that fits the joint width. Work sealant into joints so as to fill the joints solidly without air pockets. Tool sealant after application to ensure adhesion. Apply sealant uniformly smooth and free of wrinkles. Upon completion of sealant application, roughen partially filled or unfilled joints, apply additional sealant, and tool smooth as specified. Apply sealer over sealants in accordance with the sealant manufacturer's printed instructions.

3.5 PROTECTION AND CLEANING

3.5.1 Protection

Protect areas adjacent to joints from sealant smears. Masking tape may be used for this purpose if removed 5 to 10 minutes after the joint is filled and no residual tape marks remain.

3.5.2 Final Cleaning

Upon completion of sealant application, remove remaining smears and stains and leave the work in a clean and neat condition.

a. Masonry and Other Porous Surfaces: Immediately remove fresh sealant that has been smeared on adjacent masonry, rub clean with a solvent, and remove solvent residue, in accordance with sealant manufacturer's printed instructions. Allow excess sealant to cure for 24 hour then remove by wire brushing or sanding. Remove resulting debris.

b. Metal and Other Non-Porous Surfaces: Remove excess sealant with a solvent moistened cloth. Remove solvent residue in accordance with solvent manufacturer's printed instructions.

-- End of Section --
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