



Volume 1 of 2 Project Manual

**DEEP West District Headquarters
Black Rock State Park
2065 Thomaston Road
Watertown, CT
Project No.: BI-T-615**

**Prepared By:
TLB Architecture, LLC
92 West Main Street
Chester, Connecticut
06412**

Josh Geballe – Commissioner

**State of Connecticut
Department of Administrative Services
Construction Services
450 Columbus Boulevard
Hartford, CT 06103**

Project Manual Date: May 15, 2020

IMPORTANT NOTICE - FOR YOUR INFORMATION

**From The State of Connecticut
Department of Administrative Services - Construction Services
Office of Legal Affairs, Policy, and Procurement**

THIS PROJECT MANUAL CONTAINS UPDATED REQUIREMENTS:

11/19/2020: NEW: CTsource – the NEW State Contracting Portal.

As of August 3, 2020, the new e-Procurement system, “CTsource”, replaced BizNet as the “State Contracting Portal” for all Connecticut Department of Administrative Services / Construction Services (DAS/CS) Solicitations and Contracts. CTsource is a secure, web-based e-Procurement system implemented by the State of Connecticut with its partner, Perfect Commerce LLC (a PROACTIS Company), using their WebProcure application. Although *anyone* can view Solicitations and Contracts on CTsource, only *registered Suppliers** are able to *respond* to a Solicitation.

*Examples of Suppliers include vendors, contractors, architects, engineers, consultants, service providers, manufacturers, distributors, and any others who are interested in doing business with the State of Connecticut.

DAS/CS requires all firms to upload their **Bid Package Documents online** through the *new* CTsource e-Procurement system *prior* to the date and time of the **Bid Opening**. Detailed instructions for uploading Bid Package Documents can be found in the DAS/CS publication, **6001 Construction Online Bidding Instructions**, available for download from the online DAS/CS Library (<http://portal.ct.gov/DASCSLibrary>) > 6000 Series.

CTsource can be found by selecting the following link: <https://portal.ct.gov/DAS/CTSource/CTSource>

Register on CTsource at the Supplier Registration Portal: <https://portal.ct.gov/DAS/CTSource/Registration>.

DAS/CS Solicitations can be found on the DAS/CS Bid Board: <https://portal.ct.gov/DAS/Construction-Services/BidBoard>.

DAS/CS Contracts can be found on the CTsource Contract Board (filter by “DAS Construction Services” under “Organization”): <https://portal.ct.gov/DAS/CTSource/ContractBoard>

11/19/2020: UPDATED: CONTRACTOR AND SUBCONTRACTOR PAYMENT REQUIREMENTS.

REPORTING REQUIREMENTS: For compliance with the Connecticut General Statutes Sections 4b-95 and 49-41a, DAS/CS requires every Contractor (and its Subcontractors) who has been awarded a DAS/CS construction contract to log on to the State of Connecticut web-based platform, **PMWeb**, each month and enter payments they have received from the state, from the Contractor, or from a higher tier Subcontractor (as applicable).

The process is described as follows: After the state has made payment to the contractor for work performed (and purchases made) by it and its Subcontractors, the Contractor will input the payment date and amount they receive from the state on a monthly basis. The Contractor’s first-level Subcontractor (Tier 1 Subcontractor) will input the payment they receive from the Contractor. The second-level Subcontractor (Tier 2 Subcontractor) will input the payment they receive from the Tier 1 Subcontractor. And so on.

Detailed instructions can be found in the DAS/CS publication, **6002 Instructions to Contractors and Subcontractors for Entering Payments Online**, available for download from the online DAS/CS Library (<http://portal.ct.gov/DASCSLibrary>) > 6000 Series.

CONTRACTING REQUIREMENTS: Contractors awarded a DAS/CS construction contract shall contain a provision in their subcontract agreements requiring their Subcontractors to enter payment receipt from the Contractor in the State of Connecticut web-based platform, **PMWeb**, for work performed or purchases made in relation to state projects.

11/19/2020: NEW: Employment Information Form.

Every Contractor (and its Subcontractors) who has been awarded a DAS/CS construction contract shall submit employment statistics contained in the "**Employment Information Form**" located within their firm's **CTsource** account, indicating that the composition of its workforce is at or near parity when compared to the racial and sexual composition of the workforce in the relevant labor market area. Follow the instructions in **6001 Construction Online Bidding Instructions**, available for download from the online DAS/CS Library (<http://portal.ct.gov/DASCSLibrary>) > 6000 Series.

Updated Forms:

- 00 45 14 General Contractor Bidder's Qualification Statement
- 00 45 15 Objective Criteria Established for Evaluating Qualifications of Bidders
- 00 45 17 Named Subcontractor Bidder's Qualification Statement

11/17/2020: NEW: Anti-Discrimination and Anti-Harassment Requirements.

In accordance with DAS Policy, DAS strictly prohibits discrimination, including sexual harassment and harassment based on all of the following legally protected classes: race; color; religious creed; age; sex; pregnancy; sexual orientation; gender identity or expression; marital status; national origin; ancestry; intellectual disability; physical disability (including, but not limited to, blindness); mental disability; or, veteran status. This prohibition applies to all DAS-administered construction projects, and entities and individuals performing work on such projects. All contractors, subcontractors, and suppliers, as well as their officers, directors, shareholders, partners, employees, or other individuals associated with such entities, are expected to participate in these efforts to ensure that no discriminatory or harassing conduct occurs in connection with a DAS project. This is part of the meaning of a responsible contractor as a contractor with the integrity to ensure faithful performance of the work in a non-discriminatory manner.

DAS will consider instances, of which we become aware, of **alleged** discriminatory behavior on the part of a Bidder, subcontractors or suppliers. This will include the conduct of such entities' officers, directors, shareholders, partners, and employees. Such discriminatory conduct can include instances of name-calling, racist jokes or comments, bullying, intimidation and harassment on the basis of the person being a member of the protected class. Instances of **proven** discriminatory conduct on the part of an entity or individual **may** result in DAS not awarding a contract to a contractor, or require the substitution of a subcontractor or supplier.

In situations involving discriminatory conduct on the part of an officer, director, shareholder, partner or employee, DAS will also consider, as part of the responsibility review, the actions taken by the contractor, subcontractor and supplier to address and mitigate the individual's conduct. DAS will expect that the contractor, subcontractor, or supplier implement systematic monitoring and evaluation of the workplace to exclude such conduct. Regardless of where the discriminatory conduct occurs, if the contractor, subcontractor or supplier fails to address it, the contractor, subcontractor or supplier **shall not be** considered responsible or having the integrity necessary for the faithful performance of the work.




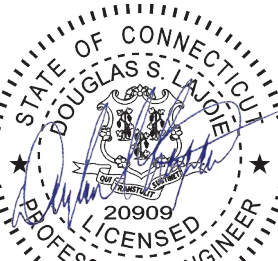
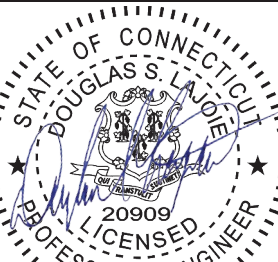
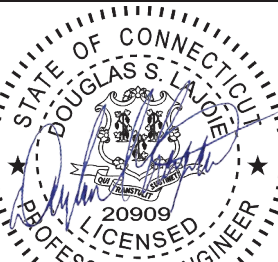
Updated Forms:

- 00 45 14 General Contractor Bidder's Qualification Statement
- 00 45 15 Objective Criteria Established for Evaluating Qualifications of Bidders
- 00 45 17 Named Subcontractor Bidder's Qualification Statement


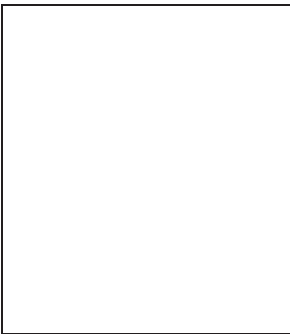
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| Project Title: | DEEP West District Headquarters |
| Project Location: | Watertown, CT |
| Project Number: | BI-T-615 |
| Architect/Engineer: | TLB Architecture, LLC; 92 West Main Street, Chester, CT 06412 |

SEALS, SIGNATURES, AND DATES OF DESIGN PROFESSIONALS OF RECORD

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|---|---|--|--|
|  <p>(Seal and Signature)</p> | <p>Architect Professional Certification: I hereby certify that these documents were prepared or approved by me and that I am a duly registered Architect.</p> <p>Michael P. Fortuna, AIA (Print Consultant Name) 5143</p> <hr/> <p>License No. 07/31/21</p> <hr/> <p>Expiration Date</p> |  <p>(Seal and Signature)</p> | <p>Civil Engineer Professional Certification: I hereby certify that these documents were prepared or approved by me and that I am a duly registered Professional Engineer.</p> <p>Richard E. Couch (Print Consultant Name) 15480</p> <hr/> <p>License No. 1/31/2021</p> <hr/> <p>Expiration Date</p> |
|  <p>(Seal and Signature)</p> | <p>Structural Engineer Professional Certification: I hereby certify that these documents were prepared or approved by me and that I am a duly registered Professional Engineer.</p> <p>Richard A. Centola, P.E. (Print Consultant Name) 0022660</p> <hr/> <p>License No. 01/31/21</p> <hr/> <p>Expiration Date</p> |  <p>(Seal and Signature)</p> | <p>Electrical Engineer Professional Certification: I hereby certify that these documents were prepared or approved by me and that I am a duly registered Professional Engineer.</p> <p>Douglas S. Lajoie (Print Consultant Name) 20909</p> <hr/> <p>License No. 1/31/21</p> <hr/> <p>Expiration Date</p> |
|  <p>(Seal and Signature)</p> | <p>Mechanical Engineer Professional Certification: I hereby certify that these documents were prepared or approved by me and that I am a duly registered Professional Engineer.</p> <p>Douglas S. Lajoie (Print Consultant Name) 20909</p> <hr/> <p>License No. 1/31/21</p> <hr/> <p>Expiration Date</p> |  <p>(Seal and Signature)</p> | <p>Fire-Protection Engineer Professional Certification: I hereby certify that these documents were prepared or approved by me and that I am a duly registered Professional Engineer.</p> <p>Douglas S. Lajoie (Print Consultant Name) 20909</p> <hr/> <p>License No. 1/31/21</p> <hr/> <p>Expiration Date</p> |

End of Section
00 01 07 Seals Page

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|  <p>(Seal and Signature)</p> | <p>Landscape Architect Professional Certification: I hereby certify that these documents were prepared or approved by me and that I am a duly registered Professional Engineer.</p> <p>Gary J. Guimond</p> <hr/> <p>(Print Consultant Name) CT 827</p> <hr/> <p>License No.</p> <hr/> <p>07/31/2021</p> <hr/> <p>Expiration Date</p> |  | <hr/> <hr/> <hr/> |
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DIVISION 00 PROCUREMENT AND CONTRACTING REQUIREMENTS

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| 00 01 01 | Title Page | 1 | <input type="checkbox"/> |
| 00 01 07 | Seals Page | 2 | <input type="checkbox"/> |
| 00 01 10 | Table of Contents | 9 | <input type="checkbox"/> |
| 00 01 15 | List of Drawing Sheets | 8 | <input type="checkbox"/> |
| 00 11 16 | Invitation to Bid | 3 | <input type="checkbox"/> |
| 00 21 13 | Instructions to Bidders | 17 | <input type="checkbox"/> |
| 00 25 13 | Pre-Bid Meeting Agenda | 4 | <input type="checkbox"/> |
| 00 30 00 | General Statements for Available Information | 4 | <input type="checkbox"/> |
| 00 30 10 | General Statement for Existing Conditions Information | | <input type="checkbox"/> |
| 00 30 20 | General Statement for Environmental Assessment Information | | <input type="checkbox"/> |
| 00 30 30 | General Statement for Hazardous Building Materials Inspection and Inventory | | <input checked="" type="checkbox"/> |
| 00 30 40 | General Statement for Subsurface Geotechnical Report | | <input type="checkbox"/> |
| 00 30 50 | General Statement for Elevator Agreement | | <input type="checkbox"/> |
| 00 30 60 | General Statement for FM Global Checklist for Roofing Systems | | <input type="checkbox"/> |
| 00 30 70 | General Statement for "Statement of Special Inspections" | | <input type="checkbox"/> |
| 00 30 80.1 | General Statement for "Geothermal Well Test Report" | | <input type="checkbox"/> |
| 00 30 80.2 | General Statement for "CT DEEP License and Floor Management Certification Approval and General Permit for Resource General Construction Activities – Approval of Authorization | | <input type="checkbox"/> |
| 00 40 14 | Certificate (of Authority) (<i>Bidder uploads to CTsource</i>) | 2 | <input type="checkbox"/> |
| 00 40 15 | <i>NEW: DAS Contractor Prequalification Certificate Requirements (Bidder uploads to CTsource)</i> | 1 | <input type="checkbox"/> |
| 00 40 16 | <i>NEW: DAS Update (Bid) Statement Requirements (Bidder uploads to CTsource)</i> | 1 | <input type="checkbox"/> |
| 00 41 00 | Bid Proposal Form (<i>Bidder uploads to CTsource</i>) | 10 | <input type="checkbox"/> |
| 00 41 10 | Bid Package Submittal Requirements | 4 | <input type="checkbox"/> |
| 00 43 16 | Standard Bid Bond (<i>Bidder uploads to CTsource</i>) | 1 | <input type="checkbox"/> |
| 00 45 14 | General Contractor Bidder's Qualification Statement (<i>Bidder uploads to CTsource</i>) | 7 | <input type="checkbox"/> |
| 00 45 15 | Objective Criteria Established for Evaluating Qualifications of Bidders | 4 | <input type="checkbox"/> |
| 00 45 17 | Named Subcontractor Bidder's Qualification Statement | 8 | <input type="checkbox"/> |
| 00 52 03 | Contract | 3 | <input type="checkbox"/> |
| 00 52 73 | Subcontract Agreement Form | 3 | <input type="checkbox"/> |
| 00 62 16 | Certificate of Insurance | 1 | <input type="checkbox"/> |
| 00 62 16.1 | Asbestos Attachment to Acord Form | 1 | <input checked="" type="checkbox"/> |
| 00 62 39 | <i>NEW: DAS Set-Aside Certificate Requirements (Bidder uploads to CTsource)</i> | 1 | <input type="checkbox"/> |
| 00 72 13 | General Conditions of the Contract for Construction – For Design-Bid-Build | 33 | <input type="checkbox"/> |
| 00 73 27 | Set-Aside Contractor Schedule – <i>SAMPLE</i> | 2 | <input type="checkbox"/> |
| 00 73 38 | CHRO Contract Compliance Regulations | 7 | <input type="checkbox"/> |
| 00 73 40 | <i>NEW: CHRO Bidder Contract Compliance Monitoring Report Requirements (Bidder uploads to CTsource)</i> | 1 | <input checked="" type="checkbox"/> |
| 00 73 44 | Prevailing Wage Rates/Contractor's Wage Certification/Payroll Certification | 36 | <input type="checkbox"/> |

00 73 63 CT DOC Security Requirements

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00 92 10 Additional Forms To be Submitted After Bond Commission Funding Approval

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00 92 30 Procedures Regarding Taxation for Nonresident General/Prime Contractor and Subcontractors

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DIVISION 01 GENERAL REQUIREMENTS

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| 01 11 00 | Summary of Work | 8 | <input type="checkbox"/> |
| 01 20 00 | Contract Considerations | 6 | <input type="checkbox"/> |
| 01 23 13 | Supplemental Bids | 2 | <input type="checkbox"/> |
| 01 25 00 | Substitution Procedures | 4 | <input type="checkbox"/> |
| 01 26 00 | Contract Modification Procedures | 4 | <input type="checkbox"/> |
| 01 29 76 | Progress Payment Procedures | 6 | <input type="checkbox"/> |
| 01 31 00 | Project Management and Coordination | 6 | <input type="checkbox"/> |
| 01 31 19 | Project Meetings | 4 | <input type="checkbox"/> |
| 01 32 16 | Construction Progress Schedules | | <input checked="" type="checkbox"/> |
| 01 32 16.13 | CPM Schedules | 14 | <input type="checkbox"/> |
| 01 32 33 | Photographic Documentation | 2 | <input type="checkbox"/> |
| 01 33 00 | Submittal Procedures | 8 | <input type="checkbox"/> |
| 01 35 16 | Alteration Project Procedures | | <input checked="" type="checkbox"/> |
| 01 35 26 | Government Safety Requirements | 12 | <input type="checkbox"/> |
| 01 42 20 | Reference Standards & Definitions | 4 | <input type="checkbox"/> |
| 01 45 00 | Quality Control | 6 | <input type="checkbox"/> |
| 01 45 23.13 | Testing for Indoor Air Quality, Baseline Indoor Air Quality, and Materials | 4 | <input type="checkbox"/> |
| 01 50 00 | Temporary Facilities & Controls | 12 | <input type="checkbox"/> |
| 01 56 39 | Temporary Tree and Plant Protection | 10 | <input type="checkbox"/> |
| 01 57 30 | Indoor Environmental Control | 2 | <input type="checkbox"/> |
| 01 57 40 | Construction Indoor Air Quality Management Plan (Re: 01 81 19) | | <input checked="" type="checkbox"/> |
| 01 60 00 | Product Requirements | 4 | <input type="checkbox"/> |
| 01 71 23 | Field Engineering | 2 | <input type="checkbox"/> |
| 01 73 29 | Cutting and Patching | | <input checked="" type="checkbox"/> |
| 01 74 19 | Construction Waste and Demolition Management & Disposal | 20 | <input type="checkbox"/> |
| 01 75 00 | Starting & Adjusting | 2 | <input type="checkbox"/> |
| 01 77 00 | Closeout Procedures | 6 | <input type="checkbox"/> |
| 01 78 23 | Operation & Maintenance Data | 6 | <input type="checkbox"/> |
| 01 78 30 | Warranties & Bonds | 6 | <input type="checkbox"/> |
| 01 81 13 | Sustainable Design Requirements | 34 | <input type="checkbox"/> |
| 01 81 19 | Construction Indoor Air Quality Requirements | 12 | <input type="checkbox"/> |
| 01 91 13 | General Commissioning Requirements | 24 | <input type="checkbox"/> |

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TECHNICAL SPECIFICATIONS

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| 074643 | Composite Siding and Trim | 6 |
| 075323 | Ethylene-Propylene-Diene-Monomer (EPDM) Roofing | 16 |
| 076200 | Sheet Metal Flashing and Trim | 16 |
| 077100 | Roof Specialties | 8 |
| 077253 | Snow Guards | 4 |
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| 078443 | Joint Firestopping | 6 |
| 079200 | Joint Sealants | 10 |

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| DIVISION 08 | OPENINGS | Not Used <input type="checkbox"/> |
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| 081113 | Hollow Metal Doors and Frames | 10 |
| 081416 | Flush Wood Doors | 10 |
| 083113 | Access Doors and Frames | 6 |
| 083323 | Overhead Coiling Doors | 8 |
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| 084213 | Aluminum-Framed Entrances | 12 |
| 085200 | Wood Windows | 10 |
| 087100 | Door Hardware | 20 |
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| 089119 | Fixed Louvers | 8 |

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| DIVISION 09 | FINISHES | Not Used <input type="checkbox"/> |
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| 092116 | Gypsum Board Shaftwall Assemblies | 6 |
| 092216 | Non-Structural Metal Framing | 10 |
| 092900 | Gypsum Board | 8 |
| 095113 | Acoustical Panel Ceilings | 12 |
| 096513 | Resilient Base and Accessories | 6 |
| 096813 | Tile Carpeting | 8 |
| 099123 | Interior Painting | 8 |
| 099300 | Staining and Transparent Finishing | 8 |

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| DIVISION 10 | SPECIALTIES | Not Used <input type="checkbox"/> |
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| Section No. | Title | Page Count |
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| 101423 | Panel Signage | 8 |
| 101425 | Room Identification Panel Signage | 8 |
| 102113 | Plastic Toilet Compartments | 6 |
| 102239 | Folding Panel Partitions | 8 |
| 102800 | Toilet, Bath and Laundry Accessories | 6 |
| 104416 | Fire Extinguishers | 4 |
| 105113 | Metal Lockers | 10 |
| 107119 | Solar Shading Devices | 4 |

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| DIVISION 11 | EQUIPMENT | Not Used <input checked="" type="checkbox"/> |
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| DIVISION 12 | | FURNISHINGS | Not Used <input type="checkbox"/> |
|-------------|-----------------------------------|-------------|-----------------------------------|
| Section No. | Title | Page Count | |
| 122413 | Roller Window Shades | 8 | |
| 123553 | Metal Laboratory Casework | 14 | |
| 123623 | Plastic-Laminate-Clad Countertops | 8 | |
| 124813 | Entrance Floor Mats and Frames | 4 | |

| DIVISION 13 | | SPECIAL CONSTRUCTION | Not Used <input type="checkbox"/> |
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| Section No. | Title | Page Count | |
| 133419 | Metal Building Systems | 32 | |

| DIVISION 14 | | CONVEYING SYSTEMS | Not Used <input type="checkbox"/> |
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| Section No. | Title | Page Count | |
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| DIVISION 17 | RESERVED |
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| DIVISION 18 | RESERVED |
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| DIVISION 20 | RESERVED |
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| 210523 | General Duty Valves Pipe and Fittings for Fire Suppression | 10 | |
| 210548 | Vibration and Seismic Controls for Fire Suppression Piping and Equipment | 8 | |
| 211313 | Wet Pipe Sprinkler Systems | 10 | |

| DIVISION 22 | | PLUMBING | Not Used <input type="checkbox"/> |
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| Section No. | Title | Page Count | |
| 220400 | General Conditions for Plumbing Trades | 24 | |
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| 220513 | Common Motor Requirements for Plumbing Equipment | 4 |
| 220516 | Expansion Fittings and Loops for Plumbing Piping | 6 |
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| 223000 | Plumbing Specialties | 8 |
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| 223500 | Domestic Water Heater Exchangers | 4 |
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| DIVISION 23 | HEATING, VENTILATING AND AIR CONDITIONING | Not Used <input type="checkbox"/> |
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| Section No. | Title | Page Count |
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| 230400 | General Conditions for Mechanical Trades | 24 |
| 230500 | Common Work Results for HVAC | 10 |
| 230513 | Common Motor Requirements for HVAC Equipment | 4 |
| 230516 | Expansion Fittings and Loops for HVAC Piping | 6 |
| 230523 | General Duty Valves for HVAC Piping | 8 |
| 230529 | Hangers and Supports for HVAC Piping and Equipment | 6 |
| 230548 | Vibration Controls for HVAC Piping and Equipment | 10 |
| 230593 | Testing, Adjusting and Balancing for HVAC | 12 |
| 230700 | HVAC Insulation | 14 |
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| 232113 | Hydronic Piping | 12 |
| 232116 | Hydronic Piping Specialties | 10 |
| 232123 | Hydronic Pumps | 6 |
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| 233100 | HVAC Ducts and Casings | 10 |
| 233300 | Air Duct Accessories | 8 |
| 233303 | Sound Attenuators | 6 |
| 233400 | HVAC Fans | 8 |
| 233600 | Air Terminal Units | 4 |
| 233700 | Air Outlets and Inlets | 4 |
| 237330 | Indoor Central Station Air-Handling Units | 10 |
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| 238200 | Hydronic Units | 8 |
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| DIVISION 26 | ELECTRICAL | Not Used <input type="checkbox"/> |
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| 260400 | General Conditions for Electrical | 24 |
| 260503 | Equipment Wiring Connections | 4 |
| 260519 | Low-Voltage Electrical Power Conductors and Cables | 16 |
| 260526 | Grounding and Bonding for Electrical Systems | 12 |
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| 262726 | Wiring Devices | 12 |
| 262813 | Fuses | 4 |
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| 264500 | Photovoltaic System | 16 |
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| DIVISION 27 | COMMUNICATIONS | Not Used <input type="checkbox"/> |
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| 270526 | Grounding and Bonding for Communications Systems | 4 |
| 270529 | Hangers and Supports for Communications | 6 |
| 270533 | Conduits and Backboxes for Communications | 8 |
| 270553 | Identification for Communications | 4 |

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|--------------------|---------------------------------------|---|
| DIVISION 28 | ELECTRONIC SAFETY AND SECURITY | Not Used <input type="checkbox"/> |
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| Section No. | Title | Page Count |
|-------------|------------------------------------|------------|
| 280529 | Hangers and Supports for Security | 6 |
| 280533 | Conduit and Backboxes for Security | 8 |
| 280553 | Identification for Security | 4 |
| 283100 | Fire Detection and Alarm | 22 |

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| DIVISION 29 | RESERVED |
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| DIVISION 30 | RESERVED |
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| DIVISION 31 | EARTHWORK | Not Used <input type="checkbox"/> |
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| Section No. | Title | Page Count |
|-------------|-----------------------------------|------------|
| 311000 | Site Clearing | 8 |
| 312000 | Earth Moving | 18 |
| 312319 | Dewatering | 8 |
| 312333 | Trenching and Backfill | 14 |
| 312500 | Erosion and Sedimentation Control | 14 |
| 315000 | Excavation Support and Protection | 8 |

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|--------------------|------------------------------|---|
| DIVISION 32 | EXTERIOR IMPROVEMENTS | Not Used <input type="checkbox"/> |
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| Section No. | Title | Page Count |
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| 321216 | Asphalt Paving | 12 |
| 321313 | Concrete Paving | 16 |
| 321613 | Precast Concrete Curbing | 4 |

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| 321723 | Pavement Markings | 8 |
| 321724 | Traffic Signs | 4 |
| 323300 | Site Furnishings | 8 |
| 323313 | Wall-mounted Bike Racks | 4 |
| 329115 | Soil Preparation | 12 |
| 329200 | Turf and Grasses | 10 |
| 329300 | Plants | 20 |

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| DIVISION 33 | UTILITIES | Not Used <input type="checkbox"/> |
|--------------------|------------------|--------------------------------------|

| Section No. | Title | Page Count |
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| 330523 | Horizontal Directional Drilling | 16 |
| 331000 | Exterior Water Utilities | 14 |
| 331001 | CT Water Company Utilities Installation | 82 |
| 332313 | Geothermal Energy Exchange Wells | 10 |
| 333000 | Exterior Sanitary Sewer Utilities | 16 |
| 333200 | Sanitary Sewage Pump Station | 16 |
| 334000 | Storm Sewer Utilities | 18 |
| 337119 | Electrical Underground Ducts and Handholes | 6 |
| 337900 | Site Grounding | 4 |

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| DIVISION 34 | TRANSPORTATION | Not Used <input checked="" type="checkbox"/> |
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| Section No. | Title | Page Count |
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|--------------------|-----------------------------|--|
| DIVISION 35 | WATERWAYS AND MARINE | Not Used <input checked="" type="checkbox"/> |
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| Section No. | Title | Page Count |
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| DIVISION 36 | RESERVED | |
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| DIVISION 37 | RESERVED | |
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| DIVISION 38 | RESERVED | |
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| DIVISION 39 | RESERVED | |
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| DIVISION 40 | PROCESS INTEGRATION | Not Used <input checked="" type="checkbox"/> |
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| Section No. | Title | Page Count |
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|--------------------|----------------------------|--|
| DIVISION 41 | MATERIAL PROCESSING | Not Used <input checked="" type="checkbox"/> |
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| Section No. | Title | Page Count |
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|--------------------|---|--|
| DIVISION 42 | PROCESS HEATING, COOLING, AND DRYING | Not Used <input checked="" type="checkbox"/> |
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| Section No. | Title | Page Count |
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| DIVISION 43 | PROCESS GAS AND LIQUID HANDLING, PURIFICATION, AND STORAGE EQUIPMENT | Not Used <input checked="" type="checkbox"/> |
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| Section No. | Title | Page Count |
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| | | |
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| DIVISION 44 | POLLUTION CONTROL EQUIPMENT | Not Used <input checked="" type="checkbox"/> |
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| Section No. | Title | Page Count |
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| | | |
|--------------------|--|---|
| DIVISION 45 | INDUSTRY SPECIFIC MANUFACTURING EQUIPMENT | Not Used <input checked="" type="checkbox"/> |
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| Section No. | Title | Page Count |
|--------------------|--------------|-------------------|
|--------------------|--------------|-------------------|

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| DIVISION 46 | RESERVED | |
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| DIVISION 47 | RESERVED | |
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| DIVISION 48 | RESERVED | |
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| DIVISION 49 | RESERVED | |
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| DIVISION 50 | PROJECT-SPECIFIC AVAILABLE INFORMATION | Page Count | Not Used <input type="checkbox"/> |
|--------------------|---|-------------------|--|

| | | | |
|-------------------|---|------------|-------------------------------------|
| 50 10 00 | Existing Conditions Survey | | <input checked="" type="checkbox"/> |
| 50 20 00 | Environmental Assessment Information – NDDB Information | 12 | <input type="checkbox"/> |
| 50 30 00 | Hazardous Building Materials Inspection and Inventory | | <input checked="" type="checkbox"/> |
| 50 40 00 | Subsurface Geotechnical Report | 106 | <input type="checkbox"/> |
| 50 50 00 | Elevator Agreement | 2 | <input type="checkbox"/> |
| 50 60 00 | FM Global Checklist For Roofing Systems | 4 | <input type="checkbox"/> |
| 50 70 00 | Statement of Special Inspections | 12 | <input type="checkbox"/> |
| 50 80 00.1 | Geothermal Well Conductivity Testing | 12 | <input type="checkbox"/> |
| 50 80 00.2 | General Statement for “CT DEEP License and Floor Management Certification Approval and General Permit for Resource General Construction Activities – Approval of Authorization | 32 | <input type="checkbox"/> |

**End of Section
00 01 10 Table of Contents**

LIST OF DRAWING SHEETS

(Note: All Drawings dated 5/15/20 unless otherwise indicated)

| Drawing Number | Sheet Title |
|-------------------|---|
| 0.0 | COVER |
| G-001 | GENERAL INFORMATION |
| G-002 | GENERAL INFORMATION |
| G-003 | CODE INFORMATION |
| G-004 | EGRESS PLANS |
| G-005 | SITE ACCESSIBILITY PLAN |
| V101 | TOPOGRAPHIC / BOUNDARY SURVEY |
| V102 | TOPOGRAPHIC / BOUNDARY SURVEY |
| CG201 | SITE DRAINAGE PLAN |
| CG301 | EROSION & SEDIMENTATION CONTROL PLAN - PHASE 1 |
| CG302 | EROSION & SEDIMENTATION CONTROL PLAN - PHASE 1 |
| CG303 | EROSION & SEDIMENTATION CONTROL PLAN - PHASE 2 |
| CS101 | SIGNAGE & STRIPING |
| CS102 | SITE SIGNAGE & STRIPING PLAN |
| CU101 | WATER MAIN PLAN AND PROFILE |
| CU102 | WATER MAIN PLAN AND PROFILE |
| CU103 | SANITARY SEWER PLAN AND PROFILE |
| CU104 | SANITARY SEWER PLAN AND PROFILE |
| CU105 | WATER MAIN BOREHOLE PLAN AND PROFILE |
| CU106 | WATER MAIN BOREHOLE PLAN AND PROFILE |
| CU107 | SANITARY SEWER BOREHOLE PLAN AND PROFILE |
| CU108 | SANITARY SEWER BOREHOLE PLAN AND PROFILE |
| CX501 | EROSION & SEDIMENTATION CONTROL NOTES AND DETAILS |
| CX502 | EROSION & SEDIMENTATION CONTROL DETAILS |
| CX503 | CIVIL DETAILS |
| CX504 | CIVIL DETAILS |
| CX505 | CIVIL DETAILS |

| Drawing Number | Sheet Title |
|-------------------|---|
| CX506 | CIVIL DETAILS |
| CX507 | CIVIL DETAILS |
| CX508 | CIVIL DETAILS |
| CX509 | CIVIL DETAILS |
| L100 | SITE ILLUSTRATIVE PLAN |
| L101 | SITE PREPARATION PLAN |
| L102 | SITE LAYOUT PLAN |
| L103 | SITE IMPROVEMENTS PLAN |
| L104 | SITE GRADING PLAN |
| L105 | SITE PLANTING PLAN |
| L301 | SITE SECTIONS |
| L402 | SITE LAYOUT ENLARGEMENT PLAN |
| L403 | SITE IMPROVEMENTS ENLARGEMENTS PLAN |
| L404 | SITE GRADING ENLARGEMENT PLAN |
| L405 | SITE PLANTING ENLARGEMENTS PLAN |
| L501 | SITE DETAILS |
| L502 | SITE DETAILS |
| L503 | SITE DETAILS |
| L504 | SITE DETAILS |
| L505 | SITE DETAILS |
| L506 | SITE DETAILS |
| B1.0 | BUILDING EXCAVATION AND BACKFILL CRITERIA |
| B2.0 | TEST PROBE PLAN |
| S0.1 | GENERAL NOTES |
| S1.0 | LOWER LEVEL PLAN |
| S1.1 | UPPER LEVEL FRAMING PLAN |
| S1.2 | MEZZANINE FRAMING PLAN |
| S1.3 | ROOF FRAMING PLAN |
| S1.4 | GARAGE FND PLAN |

| Drawing Number | Sheet Title |
|-------------------|-------------------------------------|
| AA403 | ENLARGED PLANS |
| AA404 | Omitted |
| AA405 | VERTICAL CIRCULATION |
| AA406 | CONCRETE JOINT PATTERN |
| AA501 | INTERIOR ELEVATIONS |
| AA502 | INTERIOR ELEVATIONS |
| AA503 | INTERIOR ELEVATIONS |
| AA504 | INTERIOR ELEVATIONS |
| AA505 | INTERIOR ELEVATIONS |
| AA506 | INTERIOR ELEVATIONS |
| AA507 | INTERIOR ELEVATIONS |
| AA508 | INTERIOR ELEVATIONS |
| AA509 | INTERIOR ELEVATIONS |
| AA510 | INTERIOR ELEVATIONS |
| AA511 | INTERIOR ELEVATIONS |
| AA601 | DOOR & WINDOW SCHEDULES |
| AA602 | DOOR, WINDOW & LOUVER TYPES |
| AA603 | DOOR DETAILS |
| AA604 | WINDOW / LOUVER DETAILS |
| AA701 | REFLECTED CEILING PLANS |
| AA702 | CEILING DETAILS |
| AA801 | TYPICAL DETAILS |
| AA802 | EXTERIOR DETAILS |
| AA803 | PLAN DETAILS |
| AA804 | PLAN DETAILS |
| AA805 | PAVILION PLAN, ELEVATIONS & DETAILS |
| AA806 | MILLWORK DETAILS |
| AA807 | ROOF DETAILS |
| AA808 | ROOF DETAILS |
| AA809 | DETAILS |
| AA901 | FURNITURE PLANS |

| Drawing Number | Sheet Title |
|-------------------|---|
| AA902 | SCHEDULES |
| AB101 | GARAGE PLANS |
| AB201 | GARAGE ELEVATIONS |
| AB301 | GARAGE SECTIONS |
| AB501 | GARAGE INTERIOR ELEVATIONS |
| AB801 | GARAGE TYPICAL DETAILS |
| FP001 | FIRE PROTECTION LEGENDS |
| FP102 | LOWER LEVEL FIRE PROTECTION PLAN |
| FP103 | UPPER LEVEL FIRE PROTECTION PLAN |
| FP104 | MEZZANINE LEVEL FIRE PROTECTION PLAN |
| FP501 | FIRE PROTECTION DETAILS (02/05/21) |
| P001 | PLUMBING LEGENDS |
| P101 | UNDERGROUND PLUMBING PLAN |
| P102 | LOWER LEVEL PLUMBING PLAN |
| P103 | UPPER LEVEL PLUMBING PLAN |
| P402 | GARAGE PLUMBING PLAN |
| P501 | PLUMBING DETAILS |
| P502 | PLUMBING DETAILS (02/05/21) |
| P503 | PLUMBING DETAILS |
| P504 | PLUMBING DETAILS |
| P505 | PLUMBING DETAILS |
| P601 | PLUMBING SCHEDULES (02/05/21) |
| P602 | PLUMBING SCHEDULES |
| P701 | PLUMBING RISER DIAGRAMS |
| P702 | PLUMBING RISER DIAGRAMS |
| M001 | MECHANICAL LEGENDS |
| M102 | LOWER LEVEL MECHANICAL DUCTWORK PLAN |
| M103 | UPPER LEVEL MECHANICAL DUCTWORK PLAN (02/05/21) |

| Drawing Number | Sheet Title |
|----------------|---|
| M104 | MEZZANINE LEVEL MECHANICAL DUCTWORK PLAN |
| MP102 | LOWER LEVEL MECHANICAL PIPING PLAN |
| MP103 | UPPER LEVEL MECHANICAL PIPING PLAN |
| MP104 | MEZZANINE MECHANICAL PIPING PLAN |
| M402 | GARAGE MECHANICAL PLAN (02/05/21) |
| M403 | MECHANICAL PART PLAN |
| M404 | MECHANICAL PART PLAN (02/05/21) |
| M501 | MECHANICAL DETAILS (02/05/21) |
| M502 | MECHANICAL DETAILS (02/05/21) |
| M503 | MECHANICAL DETAILS |
| M504 | MECHANICAL DETAILS |
| M601 | MECHANICAL SCHEDULES |
| M602 | MECHANICAL SCHEDULES (02/05/21) |
| M603 | MECHANICAL SCHEDULES |
| M701 | MECHANICAL TEMPERATURE CONTROLS DIAGRAMS |
| M702 | MECHANICAL TEMPERATURE CONTROLS DIAGRAMS |
| M703 | MECHANICAL TEMPERATURE CONTROLS DIAGRAMS |
| E001 | ELECTRICAL SYMBOLS, NOTES AND ABBREVIATIONS |
| EL102 | LOWER LEVEL ELECTRICAL LIGHTING PLAN |
| EL103 | UPPER LEVEL ELECTRICAL PLAN |
| EL104 | MEZZANINE LEVEL ELECTRICAL LIGHTING PLAN |
| EP102 | LOWER LEVEL ELECTRICAL POWER PLAN |
| EP103 | UPPER LEVEL ELECTRICAL POWER PLAN |
| EP104 | MEZZANINE LEVEL ELECTRICAL POWER PLAN |
| EP105 | ELECTRICAL PHOTOVOLTAIC ROOF PLAN |
| E402 | GARAGE ELECTRICAL PLAN |
| E403 | ELECTRICAL PART PLANS |
| E501 | ELECTRICAL ONE-LINE POWER RISER DIAGRAM |
| E502 | ELECTRICAL PHOTOVOLTAIC RISER DIAGRAM AND DETAILS |
| E503 | ELECTRICAL DETAILS |

| Drawing Number | Sheet Title |
|-------------------|--------------------------------|
| E504 | ELECTRICAL DETAILS |
| E505 | ELECTRICAL DETAILS |
| E506 | ELECTRICAL DETAILS |
| E507 | ELECTRICAL DETAILS |
| E508 | ELECTRICAL DETAILS |
| E509 | ELECTRICAL DETAILS |
| E510 | FIRE ALARM RISER DIAGRAM |
| E601 | ELECTRICAL SCHEDULES |
| E602 | ELECTRICAL PANEL SCHEDULES |
| E603 | ELECTRICAL PANEL SCHEDULES |
| SE-1 | SITE ELECTRICAL PLAN |
| SU-1 | SITE UTILITIES PLAN (02/05/21) |

END OF SECTION

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|--------------------|-------|---------------------|----------------|
| Advertisement No.: | 21-03 | Advertisement Date: | March 12, 2021 |
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| <p>INVITATION TO BID</p> <p>Connecticut Department of Administrative Services (DAS) Construction Services (CS) Office of Legal Affairs, Policy and Procurement 450 Columbus Blvd, Suite 1302, Hartford, CT 06103-1835</p> |
|--|

| | |
|---|--|
| Find Invitations to Bid on the State Contracting Portal: | Go to the DAS website www.ct.gov/das Click on “ State Contracting Portal ”; Select “ Administrative Services, Construction Services ”; Select the appropriate Invitation to Bid . |
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| Instructions for On-Line Bidding: | Follow the instructions in 6001 Construction On-line Bidding Instructions . (http://portal.ct.gov/-/media/DAS/Construction-Services/DAS-CS-Library/6000-Series/6001-Construction-On-Line-Bidding-Instructions.pdf) For questions, call 860-713-5794. |
|--|--|

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|--------------------------------------|--|-------------------------|--------------------|-----------------------|--------------|---|---------------------|----|
| Date and Time of Bid Opening: | <table border="1" style="display: inline-table;"> <tr> <td style="text-align: center;">April <i>(Month)</i></td> <td style="text-align: center;">21 <i>(Day)</i></td> <td style="text-align: center;">2021 <i>(Year)</i></td> </tr> </table> | April <i>(Month)</i> | 21 <i>(Day)</i> | 2021 <i>(Year)</i> | Time: | <table border="1" style="display: inline-table;"> <tr> <td style="text-align: center;">1:00 <i>(ET)</i></td> <td style="text-align: center;">PM</td> </tr> </table> | 1:00 <i>(ET)</i> | PM |
| April <i>(Month)</i> | 21 <i>(Day)</i> | 2021 <i>(Year)</i> | | | | | | |
| 1:00 <i>(ET)</i> | PM | | | | | | | |

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| This Invitation to Bid is for the following Project: |
|---|

| | | | |
|---|--|--|-------------|
| Project Title: | DEEP West District Headquarters Black Rock State Park | | |
| Project Location: | 2065 Thomaston Road Watertown, CT | | |
| Project Number: | BI-T-615 | | |
| Project Description: | See Specifications Section 01 11 00 Summary of Work, Section 1.3 | | |
| Construction Costs: | Greater Than \$500,000 | | |
| Bidding Limited To: | Contractors Prequalified by DAS for General Building Construction (Group B) | | |
| Threshold Limits: (C.G.S. §29-276b) | This Project DOES NOT exceed Threshold Limits. | | |
| Set Aside Requirements: | SBE Subcontractors &/or Suppliers: 25%; MBE Subcontractors &/or Suppliers: 6.25% | | |
| Date DAS/CS Began Planning Project: | 10/6/2016 | | |
| Special Requirements: | Experience w/LEED & High-Performance Bldgs. See Sections 00 45 15 & 01 81 13 | | |
| Cost Estimate Range: | \$ 9,781,170. | To \$ | 10,295,968. |
| Date Plans & Specs Ready: | March 12, 2021 | | |
| Plans & Specs Download: | Plans & Specs are available for electronic download on the DAS State Contracting Portal. | | |
| Contract Time Allowed: | Calendar Days: | 365 | |
| Liquidated Damages: | \$ 2,769.00 | Per Calendar Day Beyond Substantial Completion. | |
| | \$ 1,950.00 | Per Calendar Day Beyond 90 days After Substantial Completion | |



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| Advertisement No.: | 21-03 | Advertisement Date: | March 12, 2021 |
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| Invitation to Bid (continued) |
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|---|---|--|------------------------------------|
| Pre-Bid Meeting Date: | March 23, 2021 | | |
| | <input type="checkbox"/> | Bidders are <i>strongly encouraged</i> to attend the Pre-Bid Meeting. | |
| | <input checked="" type="checkbox"/> | Bidders are <i>required</i> to attend a MANDATORY Pre-Bid Meeting. | |
| Pre-Bid Meeting Time: | 11.00 | <input checked="" type="checkbox"/> AM | <input type="checkbox"/> PM |
| Pre-Bid Meeting Location: | Black Rock State Park, 2065 Thomaston Road, Watertown, CT – Meet at the gate to the beach area Meeting Link: : Black Rock State Park--Getting Here (ct.gov) | | |
| Pre-Bid Meeting Contact: | DAS/CS Project Manager: | Ira Henowitz | |
| | Phone No.: | 860-614-1733 | |
| Pre-Bid Meeting Registration: | At the Pre-Bid Meeting, all prospective bidders shall <i>sign</i> his or her name on the official roster and <i>list</i> the name and address of the company he or she represents. For MANDATORY Pre-Bid Meetings, this shall be done no later than the designated start time of the Pre-Bid Meeting. No attendee will be allowed to register <i>after</i> the advertised start time. Bids submitted by contractors who have <i>not properly</i> registered and attended the MANDATORY Pre-Bid Meeting <i>shall be rejected as non-responsive</i> . See Section 00 25 13 Pre-Bid Meeting Agenda for additional details. | | |
| Bid Proposal Submission and Other Bid Submittal Requirements: | See Sections 00 21 13 Instructions to Bidders, 00 41 00 Bid Proposal Form, and 00 41 10 Bid Package Submittal Requirements for Bid Proposal submission requirements, including requirements for Affidavits, Certifications, Addenda, Pre-Bid Equals and Substitution Requests, and other bidding documents. | | |
| Bid Upload and Bid Opening: | Bids can be uploaded and edited electronically in BizNet UNTIL 1:00 p.m. on the Bid Opening Date and thereafter shall be locked down and publicly opened in the State Contracting Portal. | | |
| Bid Results: | Within approximately two (2) days after the Bid Opening Date, the Bid Results will be posted on the State Contracting Portal. | | |
| Guide to the Code of Ethics For Current or Potential State Contractors (for contracts greater than \$500,000): | Anyone seeking a contract with a value of more than \$500,000 shall electronically download the “ Guide to the Code of Ethics For Current or Potential State Contractors ” from the of Office of State Ethics (OSE) website www.ct.gov/ethics , then click on the “ Publications ” link: | | |
| Prevailing Wage Rates: | Prevailing wages are required on this project, in accordance with the schedule provided in the bid documents, pursuant to Connecticut General Statutes (C.G.S.) Section 31-53 (a) through (h), as amended. See Section 00 73 44 Prevailing Wage Rates. Each contractor who is awarded a contract on or after October 1, 2002 shall be subject to provisions of C.G.S. § 31-55a concerning annual adjustments to prevailing wages. Wage Rates will be posted each July 1st on the Department of Labor website www.ctdol.state.ct.us . Such prevailing wage adjustment shall not be considered a matter for any contract amendment. | | |
| To access Executive Orders: | Go to www.ct.gov > Governor Ned Lamont > Executive Orders. | | |
| UPDATED DOCUMENTS: | Many Division 00 and Division 01 documents have been updated. Read all of the contents of the Project Manual <i>carefully!</i> All Contractors are cautioned that any modifications or alterations made to either the Project Manual or any of the forms and documents contained herein may be just cause to reject the bid! | | |



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| Advertisement No.: | 21-03 | Advertisement Date: | March 12, 2021 |
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Invitation to Bid (continued)

NEW PROCESS FOR CONSTRUCTION STORMWATER GENERAL PERMIT:

See Section 01 50 00 Temporary Facilities and Controls.

For all DAS/CS construction projects disturbing **one or more total acres of land area** on a site regardless of project phasing, the **Architect/Engineer** shall be responsible for filing a Department of Energy and Environmental Protection (DEEP) *General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities (DEEP-WPED-GP-015)* registration and Stormwater Pollution Control Plan (SPCP) through the online DEEP ezFile Portal **prior** to bidding.

Once the **Contractor** is under contract with DAS/CS, and **prior** to the commencement of any construction activities, the Contractor (and all other contractors and subcontractors listed on the SPCP) shall assume responsibility for storm water pollution control and conform to the general permit obligations and requirements by **signing** the SPCP "Contractor Certification Statement" and License Transfer Form as directed by the Architect/Engineer.

At completion of the project, the Contractor shall file a Notice of Termination (DEP-PED-NOT-015) with the DEEP in order to terminate the Construction Stormwater General Permit. A project shall **only** be considered complete after all **post-construction** measures are installed, cleaned, and functioning and the site has been stabilized for at least **three (3) months** following the cessation of construction activities.

NEW PROCESS FOR CONTRACTOR AND SUBCONTRACTOR PAYMENTS REPORTING:

See Section 00 21 13 Instructions to Bidders (Subsection 3.13) and Section 0111 00 Summary of Work (Subsection 1.11).

For compliance with **C.G.S. § 4b-95 and 49-41**, DAS/CS requires every Contractor (and its Subcontractors) who has been awarded a DAS/CS construction contract to log on to the State of Connecticut web-based platform, BizNet, **each month and enter payments** they have received from the state, from the Contractor, or from a higher tier Subcontractor (as applicable).

The process is described as follows: The state will pay the Contractor on a monthly basis for work performed (and purchases made) by it and its Subcontractors. The Contractor will input the payment date and amount they receive from the state on a monthly basis. The Contractor's first-level Subcontractor (Tier 1 Subcontractor) will input the payment they receive from the Contractor. The second-level Subcontractor (Tier 2 Subcontractor) will input the payment they receive from the Tier 1 Subcontractor. And so on.

Contractors awarded a DAS/CS construction contract shall contain a **provision in their subcontract agreements** requiring their Subcontractors to enter payment receipt from the Contractor in the State of Connecticut web-based platform, BizNet, for work performed or purchases made in relation to state projects.

Detailed instructions can be found in the DAS/CS manual, "**6002 Instructions to Contractors/Subcontractors for Entering Payments in BizNet**", available for download by going to the DAS Homepage (www.ct.gov/DAS) and selecting Doing Business With The State > State Building Construction > Publications and Forms > DAS Construction Services Library > 6000 Series.

IMPORTANT NOTE:

The Commissioner of the Connecticut Department of Administrative Services reserves the right to do any of the following without liability, including but not limited to: (a) waive technical defects in the bid proposal as he or she deems best for the interest of the State; (b) negotiate with a contractor in accordance with Connecticut General Statutes Section 4b-91; (c) reject any or all bids; (d) cancel the award or execution of any contract prior to the issuance of the "Notice To Proceed"; and (e) advertise for new bids.

All Project Questions, Bid Questions, and Pre-Bid Equals and Substitution Requests must be submitted fourteen (14) Calendar Days prior to the Bid Due Date.

All **Project Questions** and **Pre-Bid Equals and Substitution Requests** must be emailed (not phoned) to the **Architect/Engineer** with a **copy** to the **Construction Administrator** and the **DAS/CS Project Manager** listed below.

| | | | |
|---|-----------------------|---------------|------------------------------|
| Architect/Engineer: | TLB Architecture, LLC | Email: | mfortuna@tlbarchitecture.com |
| Construction Administrator: | Atane Consulting | Email: | rhewey@ataneconsulting.com |
| DAS/CS Project Manager: | Ira Henowitz | Email: | Ira.Henowitz@ct.gov |
| All Bid Questions must be emailed to the DAS/CS Associate Fiscal Administrative Officer listed below. | | | |
| DAS/CS Associate Fiscal Administrative Officer: | Mellanee Walton | Email: | Mellanee.Walton@ct.gov |

Instructions to Bidders (Important updates will be shown in yellow highlights)

DAS • Construction Services • Office of Legal Affairs, Policy, and Procurement

1.0 General Bid Proposal Information

1.1 Online Bidding:

DAS/CS requires all firms to upload their **Bid Package Documents online** through the **new CTsource e-Procurement system** **prior** to the date and time of the **Bid Opening**. See **Page 1** of the **Invitation to Bid** for the **date and time of the Bid Opening**. The submission of paper Bid Package Documents is no longer acceptable by DAS/CS. The Bid Proposal **must be signed prior** to the date and time of the **Bid Opening**. Detailed instructions for uploading Bid Package Documents can be found in the DAS/CS publication *6001 Construction Online Bidding Instructions*, available for download from the online DAS/CS Library (<http://portal.ct.gov/DASCSLibrary>) > 6000 Series. For questions, email Mellanee Walton at Mellanee.Walton@ct.gov.

1.2 Bid Opening:

All Bids shall be publicly opened in **CTsource** by the awarding authority as stated in **Section 00 11 16 Invitation to Bid**.

1.3 Withdrawal of Bid:

Any Bid on CTsource can be retracted and then either deleted or edited prior to the date and time of the Bid Opening.

1.4 Disqualification from Bidding:

Any contractor who violates any provision of **Connecticut General Statutes (C.G.S.) § 4b-95**, as revised, shall be **disqualified** from bidding on other contracts for a period not to exceed **twenty-four (24) months**, commencing from the date on which the violation is discovered, for each violation.

1.5 Waive Minor Irregularities:

1.5.1 The awarding authority **shall** be authorized to **waive minor irregularities** which he or she considers in the best interest of the State, provided the reasons for any such waiver are stated in writing by the awarding authority and made a part of the contract file.

1.5.2 **No** such bid shall be rejected because of the failure to submit prices for, or information relating to, any item or items for which no specific space is provided in the bid form furnished by the awarding authority, but this sentence shall not be applicable to any failure to furnish prices or information required by **C.G.S. § 4b-95**, as revised, to be furnished in the bid form provided by the awarding authority.

1.6 Minimum Percentage of Work:

The awarding authority **may** require in the **Bid Proposal Form** that the contractor agree to perform a stated, minimum percentage of work with its **own forces**, in accordance with **C.G.S. § 4b-95(b)**.

1.7 Set-Aside Contracts:

The awarding authority **may also** require the contractor to set aside a portion of the contract for subcontractors who are eligible for **set-aside contracts**.

1.8 Connecticut Sales And Use Taxes:

1.8.1 **All Bidders shall** familiarize themselves with the current statutes and regulations of the **Connecticut Department of Revenue Services (DRS)**, including the Regulations of Connecticut State Agencies (R.C.S.A.) §12-426-18 and all relevant state statutes. The tax on materials or supplies exempted by such statutes and regulations shall not be included as part of a bid. To find and download a copy of the **Sales and Use Tax Exemption for Purchases by Qualifying Governmental Agencies (CERT-134)**, go to the DRS website: (www.ct.gov/drs) and click on the following links: Forms > Forms by Tax Type > Exemption Certificates > CERT-134.

1.8.2 The State of Connecticut construction contract has the following tax exemptions: (1) Purchasing of materials which will be physically incorporated and become a permanent part of the project; and (2) Services that are resold by the contractor. For example, if a Contractor hires a plumber, carpenter or electrician, a resale certificate may be issued to the subcontractor because these services are considered to be integral and inseparable component parts of the building contract.

1.8.3 The following items are **not** exempt from taxes when used to fulfill a State of Connecticut construction contract: Tools, supplies and equipment used in fulfilling the construction contract.

1.9 Union Labor:

Attention is called to the fact that there may or could be construction work carried on at the site by union labor. This fact must be kept in mind by all Bidders.

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| 1.10 Rejection of Bids: | |
| The awarding authority <i>shall reject</i> every such Bid Proposal , including but not limited to, the following reasons: | |
| 1.10.1 | A Bid Proposal Form that does <i>not</i> contain the signature of the bidder or its authorized representative. |
| 1.10.2 | A Bid Proposal Form that is <i>not</i> accompanied by the following documents in CTsource : <ul style="list-style-type: none"> .1 Section 00 43 16 Standard Bid Bond, completed for <i>either</i> the Bid Bond option <i>or</i> Certified Check option; .2 A Certified Check (if applicable) delivered to the DAS/CS Office of Legal Affairs, Policy, and Procurement <i>prior</i> to the date and time of the Bid Opening; .3 Section 00 45 14 General Contractor Bidder’s Qualification Statement .4 A DAS Contractor Prequalification Certificate for the Bidder for Projects <i>greater</i> than \$500,000; .5 A DAS Update (Bid) Statement for the Bidder for Projects <i>greater</i> than \$500,000; .6 A Gift and Campaign Contribution Certification – Office of Policy and Management (OPM) Ethics Form 1; .7 A Consulting Agreement Affidavit – OPM Ethics Form 5. NOTE: If the Bidder fails to submit or upload the Consulting Agreement Affidavit required under C.G.S. § 4a-81, such bidder shall be <i>disqualified</i> and the award shall be made to the next lowest responsible qualified bidder or new bids or proposals shall be sought; .8 An Ethics Affidavit (Regarding State Ethics) – OPM Ethics Form 6; .9 An Iran Certification – OPM Ethics Form 7. |
| 1.10.3 | A Bid Proposal Form that: <ul style="list-style-type: none"> .1 Fails to acknowledge all Addenda in the space provided in the Bid Proposal Form; .2 Fails to correctly list ALL of the Named Subcontractors within a particular Class of Work on the Bid Proposal Form for subcontracts in excess of \$100,000; .3 Fails to correctly state a Named Subcontractor’s price on the Bid Proposal Form; and .4 Fails to list Named Subcontractors who are DAS Prequalified at the time of the bid. |
| 1.10.4 | A Bid Proposal Form that is <i>not</i> submitted on the forms furnished for the specific project. NOTE: In no event will bids or changes in bids be made by telephone, telegraph, facsimile or other communication technology except through CTsource . <i>All</i> pages of the Bid Proposal Form <i>must</i> be uploaded to CTsource prior to the date and time of the Bid Opening. |
| 1.10.5 | A Bid Proposal Form that has omitted items, omitted pages, added items not called for, altered the form, contains conditional bids, contains alternative bids, or contains obscure bids. |
| 1.10.6 | A paper Bid Package sent to the DAS/CS Office of Legal Affairs, Policy, and Procurement. Such bids will be returned to the bidder unopened. |
| 1.10.7 | Any Bidder that does <i>not</i> make all required pre-award submittals <i>within</i> the designated time period. DAS/CS <i>may</i> reject such bids as non-responsive . |
| 1.11 Pre-Bid Meeting: | |
| 1.11.1 | See Section 00 11 16 Invitation to Bid and Section 00 25 13 Pre-Bid Meeting Agenda for details. |
| 1.11.2 | When a Pre-Bid Meeting is “ strongly encouraged ”, all attendees shall sign his or her name to the official roster and list the name and address of the company he or she represents. |
| 1.11.3 | When a Pre-Bid Meeting is MANDATORY , all attendees will be required to register. Proper registration means that the attendee has signed his or her name to the official roster and listed the name and address of the company he or she represents on the official roster no later than the designated start time of the MANDATORY Pre-Bid Meeting . Bidders are advised to register early as no attendee will be allowed to register <i>after</i> the advertised start time of the MANDATORY Pre-Bid Meeting . All bids submitted by all contractors who have not properly registered and attended the MANDATORY Pre-Bid Meeting shall be rejected as non-responsive. |
| 1.11.4 | All Bidders Attending a Pre-Bid Meeting at a Connecticut Department of Corrections (DOC) Facility shall complete and submit the DOC “Security Background Questionnaire” prior to the Pre-Bid Meeting. To find and download a copy of the Security Background Questionnaire , go to the DOC website (www.ct.gov/doc) , scroll down to “Publications” and click on “Forms” then “Security Background Questionnaire”. Complete and submit the form as directed, and obtain approval, otherwise admission to the Pre-Bid Meeting will be denied . It is recommended that the approved form be brought as evidence of approval to attend the Pre-Bid Meeting. |

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| 1.12 Pre-Bid Equals and Substitution Requests Procedures: | |
| 1.12.1 | All submissions requesting "Equals and/or Substitutions" shall be made by the Bidder in accordance with Section 01 25 00 Substitution Procedures of the Division 01 General Requirements and Article 15, Materials: Standards of Section 00 72 13 General Conditions . Every submission shall contain all the information necessary for DAS/CS to evaluate the submission and the request. Failure to submit sufficient information to make a proper evaluation, including submittal of data for the first manufacturer listed as well as the data for the " Equals and/or Substitutions " proposed, shall result in a rejection of the submission and request. Upon receipt of the submission and request, DAS/CS shall notify the Bidder that the request has been received and as soon as possible shall render a decision on such submission and request. |
| 1.12.2 | Pre-Bid-Opening Substitution of Materials and Equipment: The Owner will consider requests for equals or substitutions <i>if received</i> fourteen (14) Calendar Days prior to the Bid Opening Due Date , as stated in the Invitation To Bid . The Equal or Substitute Product Request (Form 7001) must be used to submit requests. Download Form 7001 from the online DAS/CS Library (http://portal.ct.gov/DASCSLibrary) > 7000 Series. |
| 1.12.3 | Equals and/or Substitutions Requests Submittal: Requests for Equals or Substitutions shall be submitted to the DAS/CS Project Manager, Architect / Engineer, and Construction Administrator . |
| 1.12.4 | Substitution Request Deadline: Any substitution request not complying with requirements will be denied. Substitution requests sent after the Deadline will be denied. |
| 1.12.5 | Addendum: An Addendum shall be issued to inform all prospective bidder of any accepted substitution in accordance with our addenda procedures. |
| 1.12.6 | Time Extensions: No extensions of time will be allowed for the time period required for consideration of any Substitution or Equal. |
| 1.12.7 | Post Contract Award Substitution of Materials and Equipment: All requests for "Equals and Substitutions" after the Award of the Contract shall be made only by the Prime Contractor for materials or systems specified that are no longer available. The requests will not be considered if the product was not purchased in a reasonable time after award, in accordance with Article 15, Materials: Standards of Section 00 72 13 General Conditions . |
| 1.13 Joint Ventures: | |
| 1.13.1 | Each entity in a Joint Venture shall submit with the Venture's bid a letter on their respective company letterheads stating: <ul style="list-style-type: none"> • Their agreement to bid as a Joint Venture with the other named Joint Venture, and set forth the name and address of the other Joint Venture(s). • The respective percentage of the project work that would be the responsibility of each of the Joint Ventures. |
| 1.13.2 | Prequalification: Each entity in a Joint Venture shall submit its Prequalification Certificate and Update (Bid Statement) . Each entity in a Joint Venture shall be prequalified at the time of the bid and during the entire project construction. Each entity in a Joint Venture shall have the prequalification single project limit , and remaining aggregate capacity balance to meet the value of its respective percentage of the joint proposed bid. |
| 1.13.3 | Each entity in a Joint Venture shall submit Section 00 45 14 General Contractor Bidder's Qualification Statement . |
| 1.13.4 | Bonding: The Joint Venture shall obtain the required bonding from a surety for the total amount of the contract price. |
| 1.13.5 | Insurance: Each entity in a Joint Venture shall have the required insurance coverages and limits to meet the insurance requirements of the contract. The Joint Venture shall provide Builder's Risk insurance . |
| 1.13.6 | Bid Submission and Contract Signing: If a Joint Venture submits a bid proposal, it shall be considered to be a proposal by each of the Joint Ventures, jointly and severally, for the performance of the entire contract as a Joint Venture in accordance with the terms and conditions of the contract. Each entity in a Joint Venture is required to sign the contract acknowledging that each Joint Venture shall be jointly and severally liable for the performance of the entire contract. |
| 1.13.7 | Certificate of Legal Existence: Each entity in a Joint Venture shall obtain a Certificate of Legal Existence and submit it with the contract documents. |
| 1.14 Procedure for Alleged Violation(s) of Part II Chapter 60 of C.G.S. Bidding and Contracts: | |
| 1.14.1 | The Regulations of Connecticut State Agencies establishes a procedure for promptly hearing and ruling on claims alleging a violation or violations of the contract bidding provisions of Part II of Chapter 60 of the Connecticut General Statutes (hereinafter "Chapter 60"). In view of the fact that time is normally of the essence in awarding construction contracts under Chapter 60, the grievance procedures are intended to be quick, informal and conclusive so as to avoid delays which can increase costs and jeopardize the very ability of the State to proceed with needed public works projects. |
| 1.14.2 | Download " 6510 Procedure for Alleged Violation(s) " and " 6505 Petition for Alleged Violation(s) " from the online DAS/CS Library (http://portal.ct.gov/DASCSLibrary) > 6000 Series. |

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| 1.15 Labor Market Area: | |
| 1.15.1 | All Bidders <i>shall</i> have read C.G.S. §§ 31-52 and 31-52a , as revised. These sections relate to the preference of State citizens and the preference of residents of the labor market area in which the work under the contract is to be done and the penalties for violations thereof. |
| 1.15.2 | In order to avoid violations by the contractor and to cooperate with and assist the State in the implementation of the statutory mandates, any bidder awarded a contract with the State shall be required to provide the State with the following information: <ul style="list-style-type: none"> .1 The names and addresses of employees utilized by the contractor and by its subcontractors and how long each such employee has resided in Connecticut. .2 How long each employee has resided in the labor market area, as established by the State Labor Commissioner, in which the work under the contract is to be done. Labor market areas are indicated on the end of this section. .3 Within thirty (30) days after the start of work, the contractor shall submit a signed statement setting forth the procedures the contractor and its subcontractors have taken to assure that they have sought out qualified residents of the labor market area. Also, the statement shall include information as to how many persons were considered for employment and how many were actually hired. Such procedures will include, but not be limited to, obtaining names of available persons from area Employment Security Offices. .4 In the same manner as Subsection 1.15.2.3 above, the statement shall indicate the steps taken to assure that the contractor and its subcontractors have sought out qualified residents of this State. |
| 1.15.3 | The contractor shall cooperate with and provide information to the DAS/CS Project Manager or their designee assigned to collect and verify the information required. The State may request that all such information be updated during the term of the contract at reasonable times. |
| 1.15.4 | All such information gathered and compiled by the State shall be forwarded to the Labor Commissioner. |
| 1.15.5 | Pursuant to C.G.S. § 31-52b, as revised: <p style="padding-left: 40px;">“The provisions of C.G.S. § 31-52 and 31-52a shall not apply where the State or any subdivision thereof may suffer the loss of revenue granted or to be granted from any agency or department of the federal government as a result of said sections or regulative procedures pursuant thereto.”</p> <p>However, no exception shall be determined to be applicable unless stated in writing by the Commissioner of the Department of Administrative Services.</p> |
| 1.15.6 | Website Link: For guidance on the Connecticut Department of Labor (DOL) Labor Market Areas (LMA) go to the DOL website (http://www.ctdol.state.ct.us/) and under “Program & Services”, click on “Labor Market information”. |
| 1.16 Executive Orders: | |
| 1.16.1 | All Executive Orders of which are incorporated into and are made a part of the Contract as if they had been fully set forth in it. The Contract is subject to the provisions of the following: <ul style="list-style-type: none"> .1 Executive Order No. 3: Governor Thomas J. Meskill, promulgated 06/16/71, concerning labor employment practices; .2 Executive Order No. 17: Governor Thomas J. Meskill promulgated 02/15/73, concerning the listing of employment openings; .3 Executive Order No. 16: Governor John G. Rowland promulgated 08/04/99, concerning violence in the workplace; .4 Executive Order No. 14: Governor M. Jodi Rell, promulgated 04/17/06, concerning procurement of cleaning products and services; and .5 Executive Order No. 49: Governor Dannel P. Malloy, promulgated 05/22/15, concerning the requirement for certain state contractors to disclosure campaign contributions to candidates for statewide public office or The General Assembly and to ensure convenient public access to information related to gifts and campaign contribution disclosure affidavits by state contractors. |
| 1.16.2 | All Executive Orders are available for download from the State of Connecticut website. Go to www.ct.gov , click on “Governor Ned Lamont” and scroll down to “Executive Orders”. |
| 1.17 Retaliation For Disclosure of Information: | |
| 1.17.1 | Each contract between a state or quasi-public agency and a large state contractor shall provide that, if an officer, employee, or appointing authority of a large state contractor takes or threatens to take any personnel action against any employee of the contractor in retaliation for such employee’s disclosure of information to the Auditors of Public Accounts or the Attorney General under the provisions of C.G.S. § 4-61dd (a) , the contractor shall be liable for a civil penalty of not more than five thousand dollars for each offense, up to a maximum of twenty per cent of the value of the contract. Each violation shall be a separate and distinct offense and in the case of a continuing violation each calendar day’s continuance of the violation shall be deemed to be a separate and distinct offense. The executive head of the state or quasi-public agency may request the Attorney General to bring a civil action in the Superior Court for the judicial district of Hartford to seek imposition and recovery of such civil penalty. |
| 1.17.2 | Each large state contractor shall post a notice of the provisions of C.G.S. § 4-61dd relating to large state contractors in a conspicuous place that is readily available for viewing by the employees of the contractor. |

1.18 Laws of the State of Connecticut:

Forum and Choice of Law. The Bidder agrees that in the event it is awarded a Contract, the Bidder and the State deem the Contract to have been made in the City of Hartford, State of Connecticut. Both parties agree that it is fair and reasonable for the validity and construction of the Contract to be, and it shall be, governed by the laws and court decisions of the State of Connecticut, without giving effect to its principles of conflicts of laws. To the extent that any immunities provided by Federal law or the laws of the State of Connecticut do not bar an action against the State, and to the extent that these courts are courts of competent jurisdiction, for the purpose of venue, the complaint shall be made returnable to the Judicial District of Hartford only or shall be brought in the United States District Court for the District of Connecticut only, and shall not be transferred to any other court, provided, however, that nothing here constitutes a waiver or compromise of the sovereign immunity of the State of Connecticut. The Bidder waives any objection which it may now have or will have to the laying of venue of any claims in any forum and further irrevocably submits to such jurisdiction in any suit, action or proceeding.

1.19 State's Sovereign Immunity:

Nothing in this Agreement shall be construed as a waiver or limitation upon the **State's sovereign immunity**. To the extent this Section is found to be inconsistent with any other part of this Agreement, this Section shall control. This Section of the Agreement shall survive the completion and/or termination of this Agreement.

2.0 Bid Proposal Form Instructions:

2.1 Bid Proposal Form:

2.1.1 All Bidders shall upload **ALL** pages of **Section 00 41 00 Bid Proposal Form** to **CTsource**, prior to the date and time of the Bid Opening.

2.2 Threshold Projects:

2.2.1 See **page 1** of the **Bid Proposal Form** to determine if this Project exceeds the **Threshold Limits**.

2.2.2 If this Project exceeds Threshold Limits, **all Bidders** shall list their Firm's **Major Contractor Registration License Number** in the **Bid Proposal Form**.

2.2.3 The **Apparent Low Bidder** shall also provide the Subcontractor(s) **Major Contractor Registration License** number(s) to the DAS/CS Office of Legal Affairs, Policy, and Procurement within **ten (10) business days after** receipt of the Letter of Intent from DAS/CS.

2.2.4 Summary of Registration Requirements for Major Contractors: Any person engaged in the business of construction, structural repair, structural alteration, dismantling or demolition of a structure or addition that exceeds the threshold limits provided in **C.G.S §29-276b**, or any person who, under the direction of a general contractor, performs or offers to perform any work that impacts upon the structural integrity of a structure or addition, including repair, alteration, dismantling or demolition of a structure or addition that exceeds the threshold limits shall engage in or offer to perform the work of a Major Contractor unless such person has first obtained a license or certificate of registration from the **Connecticut Department of Consumer Protection (DCP)**. Individuals must be licensed under the requirements of **C.G.S §20-341gg "Registration of Major Contractors"**. DCP shall issue a certificate of registration to any person who is prequalified pursuant to section 4a-100 who applies for registration in accordance with this section.

2.2.5 The Bidder and all Subcontractors that engage in work that impacts upon the structural integrity of a structure or addition must register as a **Major Contractor** with DCP and obtain a **Major Contractor License** issued by DCP **PRIOR** to the date and time of the Bid Opening for this Project.

2.2.6 For further information, go to the DCP Website (www.ct.gov/dcp).

2.3 Proposed Lump Sum Base Bid, Allowances, and Contingent Work:

2.3.1 The proposed **Lump Sum Base Bid** shall be set forth in the space **provided on Section 00 41 00 Bid Proposal Form**.

2.3.2 The **Proposed Lump Sum Base Bid** shall *include* all **Allowances**, all work indicated on the drawings and/or described in the specifications *except* for **Contingent Work**. See the **Bid Proposal Form, Section 01 20 00 Contract Considerations, and Section 01 23 13 Supplemental Bids** of Division 01 General Requirements for details regarding **Contingent Work**.

2.3.3 "**Contingent Work**" includes **Unit Prices** (for Earth and Rock Excavation, Environmental Remediation, and/or Hazardous Building Materials Abatement) and **Supplemental Bids**. See **Section 01 20 00 Contract Considerations** and **Section 01 23 13 Supplemental Bids**, respectively, for applicability.

2.3.4 The **Proposed Lump Sum Base Bid** shall be shown in *both numerical figures* and "**printed**" words **dollar amount**. In the event of any discrepancy the "**printed**" words **dollar amount** shall govern.

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| 2.4 Addenda and Interpretations: | |
| 2.4.1 | The Number of Addenda issued by the State of Connecticut shall be set forth in the space provided on the Bid Proposal Form . It shall be the Bidder's responsibility to make inquiry as to, and to obtain, the Addenda issued, if any. |
| 2.4.2 | Addenda , if issued, will be posted on CTsource . |
| 2.4.3 | Failure to acknowledge all Addenda in the space provided in the Bid Proposal Form shall be cause for rejection of the bid. |
| 2.4.4 | Attaching Addenda to the Bid Proposal Form does not constitute an acknowledgement of all Addenda and does not relieve the Bidder from the requirement for the Bidder to acknowledge all Addenda in the space provided on the Bid Proposal Form. |
| 2.4.5 | No interpretations of the meaning of the plans, specifications or other contract documents will be made orally at any time. Every request for such interpretation shall be in writing to the awarding authority and to be given consideration shall be received at least fourteen (14) Calendar Days <i>prior</i> to the date fixed for the opening of bids. Any and all such interpretations and any supplemental instructions will be in the form of written Addenda to the specifications which, if issued, will be posted on CTsource . |
| 2.5 Bidder's Qualification Statement and Objective Criteria for Evaluating Bidders: | |
| 2.5.1 | All Bidders shall download, complete, and upload Section 00 45 14 General Contractor Bidder's Qualification Statement to CTsource prior to the date and time of the Bid Opening. See CTsource for a template. This information shall be considered as part of the Bid Proposal Form . Failure of a Bidder to answer any question or provide required information may be grounds for the awarding authority to disqualify and reject the bid. |
| 2.5.2 | All Bidders shall comply with Section 00 45 15 Objective Criteria Established for Evaluating Qualifications of Bidders . The Objective Criteria Established for Evaluating Qualifications of Bidders are to assure that the State of Connecticut will secure the "lowest responsible and qualified bidder" who has the ability and capacity to successfully complete the Bid Proposal Form and the Work. Failure to comply with any portion of this requirement may cause rejection of the bid. Note: Individual Specification Sections may contain General Contractor and/or Subcontractor Qualification requirements that <i>exceed</i> those in Section 00 45 15 Objective Criteria Established for Evaluating Qualifications of Bidders . |
| 2.6 Bidder's Prequalification Requirements for Projects exceeding \$500,000: | |
| 2.6.1 | All Bidders for Projects with estimated Construction Costs greater than \$500,000 shall upload a current copy of their "DAS Prequalification Certificate" and "DAS Update (Bid) Statement" for the applicable Class of Work on page 1 of Section 00 11 16 Invitation to Bid to CTsource <i>prior</i> to the date and time of the Bid Opening. |
| 2.6.2 | Pursuant to C.G.S. § 4b-91(a)(2) and C.G.S. §4a-100 , as revised, every contract for the construction, reconstruction, alteration, remodeling, repair or demolition of any public building or any other public work by the state that is estimated to exceed five hundred thousand dollars (\$500,000) shall be awarded only to the lowest responsible and qualified Bidder who is " prequalified " by DAS in the Class of Work for this Project , as specified in Section 00 11 16 Invitation to Bid . No person who's Contract or Subcontract exceeds \$500,000 in value may perform work as a Contractor or Subcontractor, unless the person is prequalified , <i>at the time of bid submission</i> , in accordance with C.G.S. § 4a-100 , as amended, C.G.S. § 4b-91(a)(2) , and C.G.S. §4b-91(j) . "Prequalified" includes the contractor's or substantial subcontractor's prequalification classifications, aggregate work capacity ratings and single project limits. |
| 2.6.3 | The State may waive minor irregularities that otherwise may cause rejection of a Bid only when waiving such minor irregularities is in the best interests of the State and the minor irregularities have been corrected by the Bidder within seven (7) Calendar Days after the Bid Due Date. Failure to properly complete, sign and upload either the " DAS Prequalification Certificate " or " DAS Update (Bid) Statement " to CTsource prior to the date and time of the Bid Opening shall cause rejection of the bid and shall not be considered a minor irregularity under C.G.S. § 4b-95 . |
| 2.6.4 | See Sections 00 40 15 DAS Contractor Prequalification Certification Requirements and 00 40 16 DAS Update Bid Statement Requirements for instructions on preparing and/or downloading your Firm's " DAS Contractor Prequalification Certificate " and " DAS Update (Bid) Statement ". |
| 2.6.5 | Bidder's Certification: Within ten (10) business days after receipt of the Letter of Intent from DAS/CS, the Apparent Low Bidder shall submit a Bidder's Certification certifying that the information in the bid is true, that there has been no substantial change in the Bidder's financial position or corporate structure since its most recent DAS Prequalification Certificate and DAS Update (Bid) Statement and that the bid was made without fraud or collusion with any person. See Section 00 92 10 Additional Forms of this Project Manual for a sample form. |

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| 2.7 Named Subcontractor Requirements: | |
| 2.7.1 | All Bid Proposals shall be for the complete work as specified and shall include the names of ALL Subcontractors for the four (4) Classes of Work specified in C.G.S. § 4b-93(a) , as revised, and for each other Class of Work for which the awarding authority has required a separate section pursuant to said subsection, together with the Proposed Dollar Values of their subcontracts . The contractor shall be selected on the basis of such bids. |
| 2.7.2 | The Named Subcontractors Bid Prices shall be the prices set forth in the spaces provided on the Bid Proposal Form . |
| 2.7.3 | No bid shall be rejected because of an error in setting forth the Name of a Subcontractor as long as the Subcontractor or Subcontractors designated are clearly identifiable. |
| 2.7.4 | No bid shall be rejected because the Named Subcontractor's plans and specifications do not accompany the bid or are not submitted with the bid. |
| 2.7.5 | Failure to correctly state ALL of the Named Subcontractors' prices within a particular Class of Work on the Bid Proposal Form shall be cause for rejection of the Bid. |
| 2.7.6 | Named Subcontractor Replacement: The awarding authority may require the Bidder to replace a Named Subcontractor whenever the awarding authority determines in their sole discretion that such replacement is in the best interest of the State . |
| 2.7.7 | Named Subcontractor Substitution: |
| .1 | The awarding authority shall not permit substitution of a subcontractor for one Named in accordance with the provisions of C.G.S. § 4b-95 , as revised, except for " Good Cause ". |
| .2 | The awarding authority shall not permit substitution of a subcontractor for any designated sub-trade work bid to be performed by the Bidder's own forces in accordance with the provisions of C.G.S. § 4b-95 except for " Good Cause ". |
| .3 | "Good Cause": The term "good cause" includes but is not limited to, a subcontractor's or, where appropriate, a Bidder's: (1) death or physical disability, if the listed subcontractor is an individual; (2) dissolution, if a corporation or partnership; (3) bankruptcy; (4) inability to furnish any performance and payment bond shown on the bid form; (5) inability to obtain, or loss of, a license necessary for the performance of the particular category of work; (6) failure or inability to comply with a requirement of law applicable to contractors, subcontractors, or construction, alteration, or repair projects; and (7) failure to perform its agreement to execute a subcontract under C.G.S. § 4b-96, as revised. |
| 2.7.8 | Named Subcontractor DAS Prequalification Requirement for Subcontracts exceeding \$500,000: |
| .1 | The Three (3) Apparent Lowest Bidders shall receive <i>VIA EMAIL</i> a "Set-Aside Contractor Schedule Request" ("Request") from the DAS/CS Office of Legal Affairs, Policy, and Procurement. For Subcontracts greater than \$500,000 , the Three (3) Apparent Lowest Bidders shall submit within ten (10) Calendar Days after receipt of the Request current DAS Prequalification Certificate(s) and Update (Bid) Statement(s) for each Named Subcontractor in Table 2.7 of the Bid Proposal Form , to the extent the Class of Work for the Named Subcontractor is a Prequalification Classification . This information shall be considered as part of the Bid Proposal Form and failure to comply with any portion of this requirement shall cause rejection of the bid. |
| .2 | See Sections 00 40 15 DAS Contractor Prequalification Certification Requirements and 00 40 16 DAS Update Bid Statement Requirements for instructions on preparing and/or downloading your Firm's " DAS Contractor Prequalification Certificate " and " DAS Update (Bid) Statement ". |
| .3 | In accordance C.G.S. §4b-91(j) , no person whose subcontract <i>exceeds</i> five hundred thousand dollars in value may perform work as a subcontractor on a project, which project is estimated to cost more than five hundred thousand dollars and is paid for, in whole or in part, with state funds, <i>unless, at the time of bid submission</i> , the person is prequalified in accordance with C.G.S. §4a-100 , as amended. "Prequalified" includes the contractor's or substantial subcontractor's prequalification classifications, aggregate work capacity ratings and single project limits. For Subcontracts estimated to exceed \$500,000 , the Named Subcontractor must be " prequalified " by DAS in the Class of Work specified in Table 2.7 of Section 00 41 00 Bid Proposal Form <i>at the time of bid submission</i> , pursuant to C.G.S. §4b-91(j) and C.G.S. § 4a-100 , as amended. This requirement also applies to the Bidder, if the Bidder is a Named Subcontractor. |
| 2.7.9 | Named Subcontractor Bidder's Qualification Statements (Section 00 45 17) |
| .1 | The Three (3) Apparent Lowest Bidders shall receive <i>VIA EMAIL</i> a "Set-Aside Contractor Schedule Request" ("Request") from the DAS/CS Office of Legal Affairs, Policy, and Procurement. For Projects with estimated Construction Costs greater than \$500,000 , the Three (3) Apparent Lowest Bidders shall submit within ten (10) Calendar Days after receipt of the Request completed Section 00 45 17 Named Subcontractor Bidder's Qualification Statement(s) of this Project Manual for each Named Subcontractor in Table 2.7 of the Bid Proposal Form . This information shall be considered as part of the Bid Proposal Form and failure to comply with any portion of this requirement may cause rejection of the bid. |
| .2 | Important Note: Individual Technical Specification Sections may contain qualification requirements that exceed those from Section 00 45 17 Named Subcontractor Bidder's Qualification Statement . |

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| 2.7 Named Subcontractor Requirements (continued): | |
| 2.7.10 Bidder Performing Work as Named Subcontractor: | |
| .1 | In accordance with C.G.S. § 4b-95(c) , it shall be presumed that the Bidder intends to perform, with its own employees, all work in such four (4) Classes of Work and such other classes, for which no Subcontractor is named in Table 2.7 of the Bid Proposal Form . In accordance with C.G.S. § 4b-92 , as revised, the Bidder's qualifications for performing such work shall be subject to review. |
| .2 | In the event that the Bidder names a Subcontractor to perform some, but not all , of the separate section of the specifications for a particular Class of Work, then it will be presumed, in addition, that the Bidder intends to perform the balance of the Class of Work. Post-bid , the Bidder cannot substitute a Subcontractor for one named in the Bid Proposal Form or bring in a Subcontractor for any designated subtrade work presumed to be performed by the General Contractor's own forces, except for "Good Cause" as determined by the awarding authority. |
| .3 | If the Bidder has listed itself as a Named Subcontractor(s) for a Class(es) of Work in Table 2.7 of the Bid Proposal Form and the proposed dollar value of the Subcontract(s) is greater than \$500,000, then to the extent the Class(es) of Work is a Prequalification Classification , the Bidder shall provide a current DAS Prequalification Certificate and Update (Bid) Statement for each of the applicable Class(es) of Work within ten (10) Calendar Days after receipt of the "Set-Aside Contractor Schedule Request" from DAS/CS. Failure to comply with this requirement shall cause rejection of the bid and shall not be considered a minor irregularity under C.G.S. § 4b-95. |
| 2.8 Set-Aside Requirements: | |
| 2.8.1 Bidder's DAS Set-Aside Certificate For Projects With Construction Costs Estimated To Be Less Than \$500,000: | All Small Business Enterprise (SBE) / Minority Business Enterprise (MBE) Bidders shall upload a copy of their Firm's current " DAS Set-Aside Certificate " to CTsource prior to the date and time of the Bid Opening. See Section 00 62 39 DAS Set-Aside Certificate Requirements for instructions on obtaining a copy of your DAS Set-Aside Certificate . |
| 2.8.2 Bidder Contract Compliance Monitoring Report For Projects With Construction Costs Estimated To Be Less Than \$500,000: | All Firm's shall upload a completed copy of the Commission on Human Rights and Opportunities (CHRO) Employment Information Form " Bidder Contract Compliance Monitoring Report " with their Bid Proposal Form prior to the date and time of the Bid Opening. See Section 00 73 40 CHRO Bidder Contract Compliance Monitoring Report Requirements for instructions on finding and completing the report. |
| 2.8.3 All Bidders shall be required | to award not less than the percentage(s) stated on page 1 of Section 00 41 00 Bid Proposal Form to Subcontractors who are currently certified and eligible to participate under the State of Connecticut Set-Aside Program for SBE and/or MBE contractors, in accordance with C.G.S. § 4a-60g. Failure to meet these requirements shall cause rejection of the bid. The MBE participation does count as part of the SBE participation. |
| 2.8.4 Set-Aside Contractor Schedule Request: | The SBE/MBE participation requirement <i>must be met</i> even if the Bidder is <i>certified</i> and <i>eligible</i> to participate in the Small Business Set-Aside Program . To facilitate compliance with this requirement for set-aside subcontractors, the Three (3) Apparent Lowest Bidders shall receive VIA EMAIL a "Set-Aside Contractor Schedule Request" ("Request") from the DAS/CS Office of Legal Affairs, Policy, and Procurement. As directed in the Request, the Three (3) Apparent Lowest Bidders shall submit within ten (10) Calendar Days after receipt of the Request, a list of certified set-aside contractors to be used on this project along with the dollar amounts to be paid to each. (See Section 00 73 27 Set-Aside Contractor Schedule for a sample Request.) A copy of the current DAS Set-Aside Certificate for each Subcontracted SBE and/or MBE firm(s) listed in the " Set-Aside Contractor Schedule " must be attached to the Request. This information will be considered as part of your Bid Proposal Form and failure to comply with any portion of this requirement within the ten (10) days, including but not limited to failure to list or meet the necessary dollar amount or percentage of the bid price, will be cause to reject your bid. |
| 2.8.5 Percentage of Work Performed by SBE/MBE Contractors and Subcontractors: | The percentage of the work performed by the SBE/MBE Contractors and Subcontractors on this project shall not be less than the percentage noted in Subsection 5.1 Amount of Work Required to Be Done by "Set-Aside" Contractors of Section 00 73 38 CHRO Contract Compliance Regulations . |
| 2.8.6 To view and/or download a Set-Aside Certificate: | Go to the DAS Homepage (www.ct.gov/DAS) and click on the following links: Small and Minority Businesses > Small Business Directory. |
| 2.9 Insurance Coverages: | |
| 2.9.1 | The Insurance coverages required for this project shall be those listed in Article 35 Contractors Insurance of Section 00 73 13 General Conditions of this Project Manual. See Section 00 41 00 Bid Proposal Form and Section 00 62 16 Certificate of Insurance of this Project Manual for additional details. |
| 2.9.2 | The Apparent Low Bidder shall submit the Firm's Certificate of Liability Insurance Acord® form within ten (10) business days after receipt of the Letter of Intent from DAS/CS. |

3.0 All Other Required Bid Documents, Affidavits, and Certifications:

3.1 Affidavits and Certifications:

Important Note: The State may waive minor irregularities that otherwise may cause rejection of a Bid only when waiving such minor irregularities is in the best interests of the State and the minor irregularities have been corrected by the Bidder within seven (7) Calendar Days after the Bid Due Date. Failure to properly complete, sign and upload **all** of the following Affidavits and Certifications to **CTsource** prior to the date and time of the Bid Opening **shall** cause **rejection** of the bid and shall **not** be considered a minor irregularity under C.G.S. § 4b-95.

3.1.1 Gift and Campaign Contribution Certification – OPM Ethics Form 1: All Bidders

- .1 **All Bidders:** In accordance with Executive Order No. 49, and pursuant to C.G.S. §§ 4-250, 4-252(c) and 9-612(f)(2), as revised, any principal or key personnel of the person, firm or corporation submitting a bid or proposal for a contract that has a value of **\$50,000** or more, shall be required to upload to **CTsource** a **Gift and Campaign Contribution Certification** prior to the date and time of the Bid Opening.
- .2 Any bidder or proposer that **does not** upload the **Gift and Campaign Contribution Certification** to **CTsource** prior to the date and time of the Bid Opening as required under this section shall be **disqualified** and DAS shall award the contract to the next highest ranked proposer or the next lowest responsible qualified bidder or seek new bids or proposals. Failure to upload this form to **CTsource** **prior** to the date and time of the Bid Opening shall not be considered a minor irregularity under CGS 4b-95.
- .3 Once uploaded, an updated **Gift and Campaign Contribution Certification** shall be re-uploaded within **30 days** of any changes to the submitted information.
- .4 **Annually**, on or within **two (2)** weeks of the **anniversary** date of the execution of this contract, the Contractor shall upload a completed **Annual Certification** with authorizing resolution. For the purposes of this paragraph, the execution date of the contract will be the date the DAS Commissioner signs the contract.

3.1.2 Consulting Agreement Affidavit – OPM Ethics Form 5: All Bidders

- .1 **All Bidders:** Pursuant to C.G.S. §§ 4a -81a and 4a -81b, as revised, a **Consulting Agreement Affidavit** must be completed and uploaded to **CTsource** prior to the date and time of the Bid Opening for contracts with a value of **\$50,000** or more.
- .2 In the event that a Bidder or vendor fails or refuses to upload the **Consulting Agreement Affidavit** to **CTsource** prior to the date and time of the Bid Opening, as required under C.G.S. § 4a-81, such bidder shall be **disqualified** and the award shall be made to the next lowest responsible qualified bidder or new bids or proposals shall be sought. Failure to upload this form to **CTsource** **prior** to the date and time of the Bid Opening shall not be considered a minor irregularity under CGS 4b-95.
- .3 Once uploaded, an updated **Consulting Agreement Affidavit** **shall** be amended and re-uploaded not later than (1) **thirty (30) days** after the effective date of any such change or (2) upon the submittal of any new bid or proposal, whichever is earlier. For the purposes of this paragraph, the **execution date** of the contract will be the date the DAS Commissioner signs the contract.
- .4 Other Contributions by Individuals. Principals of Investment Services Firms, State Contractors, Principals Of State Contractors, Prospective State Contractors Or Principals Of Prospective State Contractors. Lists. Subcontracts Study. State Officials or Employees: All acquisitions, agreements and contracts are subject to the provisions of the C.G.S. § 9-612 regarding **Campaign Contribution or Contributions**.

3.1 Affidavits and Certifications Forms (continued):

3.1.3 Ethics Affidavit – OPM Ethics Form 6: All Bidders and Apparent Low Bidder

- .1 **All Bidders:** Pursuant to C.G.S. §§ 1-101mm and 1-101qq, as revised, when DAS/CS is seeking a contract for a large state construction or procurement contract having a cost of more than **\$500,000**, DAS shall inform all potential consultant and contractor firms of the summary of state ethics laws developed by the Office of State Ethics (OSE) pursuant to C.G.S. § 1-81b. “Large State Contract” means an agreement or a combination or series of agreements between a state agency and a person, firm or corporation, having a total value of more than **\$500,000** in a calendar or fiscal year a project for the construction, alteration or repair of any public building or public work. To find and download a copy of the **Guide to the Code of Ethics For Current or Potential State Contractors**, go to the Office of State Ethics (OSE) website (www.ct.gov/ethics), scroll down to “Resources”, and click on the “Publications” link.
- .2 **All Bidders:** Pursuant to C.G.S. § 1-101qq, as revised, DAS is also required to notify all potential consultant and contractor firms or a large state construction or procurement contract that they must upload an **Affirmation of Receipt of State Ethics Laws Summary** to **CTsource** prior to the date and time of the Bid Opening affirming that their key employees have read and understand the summary and agree to comply with the provisions of state ethics law.
- .3 Failure to upload this affidavit to **CTsource** prior to the date and time of the Bid Opening **shall** result in **rejection** of the bid and shall not be considered a minor irregularity under CGS 4b-95.
- .4 **Apparent Low Bidder:** Furthermore, the **Apparent Low Bidder** shall provide the **Summary of the State Ethics Laws** to each **Named Subcontractor** and any other **Subcontractor** or **Subconsultant** with a contract valued over **\$500,000** and obtain a **Subcontractor and Subconsultant State Ethics Affidavit** stating that the key personnel of the subcontractor have read, understand, and agree to comply with provisions of the state ethics laws. The **Apparent Low Bidder** shall submit such subcontractor(s) affidavits to the DAS/CS Office of Legal Affairs, Policy, and Procurement within **ten (10) business days after** receipt of the Letter of Intent from DAS/CS.

3.1.4 Iran Certification – OPM Ethics Form 7: All Bidders

- .1 **All Bidders:** Pursuant to C.G.S. § 4-252a, when DAS/CS is seeking a contract for a large state construction or procurement contract having a cost of more than **\$500,000**, an **Iran Certification** must be completed and uploaded to **CTsource** **prior to the date and time of the Bid Opening**.
- .2 Pursuant to C.G.S. § 4-252a, *“This form must always be submitted with the bid or proposal, or if there was no bid process, with the resulting contract, regardless of where the principal place of business is located. Entities whose principal place of business is located outside of the United States are required to complete the entire form, including the certification portion of the form. United States subsidiaries of foreign corporations are exempt from having to complete the certification portion of the form. Those entities whose principal place of business is located inside of the United States must also fill out the form, but do not have to complete the certification portion of the form.”*

3.1.5 Nondiscrimination Certification – Form A, B, C, D, or E: All Bidders

- .1 **All Bidders:** Pursuant to C.G.S. §§ 4a-60 and 4a-60a, as amended, a contractor must provide an awarding State agency with written representation or documentation that certifies the contractor complies with the State's nondiscrimination agreements and warranties prior to the award of any contract with the State. A **Nondiscrimination Certification** is required for all State contracts, regardless of type, term, cost or value. The **appropriate form** must be uploaded to **CTsource** prior to the date and time of the Bid Opening.
- .2 Once uploaded, an updated **Nondiscrimination Certification** shall be re-uploaded within **30 days** of any changes to the submitted information.
- .3 **Annually**, on or within **two (2) weeks** of the **anniversary** date of the execution of this contract, the Contractor shall upload a completed **Annual Certification** with authorizing resolution. For the purposes of this paragraph, the execution date of the contract will be the date the DAS Commissioner signs the contract.

- 3.1.6 For instructions on how to electronically download and upload **Affidavits and Non-Discrimination Forms**, go to the **CTsource Homepage** (<https://portal.ct.gov/DAS/CTSource/CTSource>), scroll down to “Registration”, and click on **“Supplier Registration and Portal User Guide”**.

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| 3.2 Security For Faithful Performance: | |
| 3.2.1 Certified Check or Bid Bond: All Bidders | |
| .1 | All Bidders for bids in excess of \$50,000 shall submit <i>either</i> a Certified Check or a Bid Bond , in the form required by the awarding authority. See Section 00 43 16 Standard Bid Bond in CTsource for a template and important instructions regarding submitting the Bid Bond or Certified Check. Complete and upload Section 00 43 16 Standard Bid Bond to CTsource prior to the date and time of the Bid Opening for either the Bid Bond option or the Certified Check option. |
| .2 | Certified Check Option: The Certified Check shall be drawn to the order of “ Treasurer, State of Connecticut ”, in which it is understood shall be cashed and the proceeds thereof used so far as may be necessary to reimburse the State of Connecticut for losses and damages arising by virtue of the Bidder’s failure to file the required Bonds and execute the required contract if this proposal is accepted by the Awarding Authority. |
| .3 | Bid Bond Option: The Bid Bond shall be in the form required by the awarding authority, having as surety thereto such surety company or companies acceptable to the DAS Commissioner and as are authorized to do business in this State, for an amount not less than 10 percent of the bid. |
| .4 | Return of Certified Check: All checks submitted by unsuccessful Bidders shall be returned to them <i>after</i> the contract has been awarded. |
| .5 | Failure to submit the Bid Bond or Certified Check prior to the date and time of the Bid Opening shall cause rejection of the bid and shall not be considered a minor irregularity under CGS 4b-95. |
| .6 | Forfeiture of Certified Check or Bid Bond: Failure of the successful bidder to execute a contract awarded as specified and bid shall result in the forfeiture of the certified check or bid bond. |
| 3.2.2 Performance Bond: Apparent Low Bidder: | Within ten (10) business days after receipt of the Letter of Intent from DAS/CS, the Apparent Low Bidder shall substitute for the certified check or bid bond accompanying its bid an executed performance bond , in the amount not less than 100 percent of the contract price, conditioned upon the faithful performance of the contract, and having as surety thereto such surety company or companies satisfactory to the Commissioner and as are authorized to transact business in this State. This bond is to be furnished pursuant to C.G.S. § 49-41 , as revised. See Section 00 92 10 Additional Forms of this Project Manual for a template. |
| 3.2.3 Labor and Material Bond: Apparent Low Bidder: | Within ten (10) business days after receipt of the Letter of Intent from DAS/CS, the Apparent Low Bidder shall submit a labor and material bond in the amount not less than 100 percent of the contract price which shall be binding upon the award of the contract to such bidder, with surety or sureties satisfactory to the Commissioner and as are authorized to transact business in this State, for the protection of persons supplying labor or materials in the prosecution of the work provided for in the contract for the use of each such person. Any such bond furnished shall have as principal the name of the successful Bidder. This bond is to be furnished pursuant to C.G.S. § 49-41 , as revised. See Section 00 92 10 Additional Forms of this Project Manual for a template. |
| 3.2.4 | The following section of the General Statutes of Connecticut, as revised, is inserted as information concerning this bond and will be incorporated into the Contract for the Work: C.G.S. § 49-41a. Enforcement of payment by general contractor to subcontractor and by subcontractor to his subcontractors. (a) When any public work is awarded by a contract for which a payment bond is required by section 49-41, the contract for the public work shall contain the following provisions: (1) A requirement that the general contractor, within thirty days after payment to the contractor by the State or a municipality, pay any amounts due any subcontractor, whether for labor performed or materials furnished, when the labor or materials have been included in a requisition submitted by the contractor and paid by the State or a municipality; (2) a requirement that the general contractor shall include in each of its subcontracts a provision requiring each subcontractor to pay any amounts due any of its subcontractors, whether for labor performed or materials furnished, within thirty days after such subcontractor receives a payment from the general contractor which encompasses labor or materials furnished by such subcontractor. (b) If payment is not made by the general contractor or any of its subcontractors in accordance with such requirements, the subcontractor shall set forth his claim against the general contractor and the subcontractor of a subcontractor shall set forth its claim against the subcontractor through notice by registered or certified mail. Ten days after the receipt of that notice, the general contractor shall be liable to its subcontractor, and the subcontractor shall be liable to its subcontractor, for interest on the amount due and owing at the rate of one percent per month. In addition, the general contractor, upon written demand of its subcontractor, or the subcontractor, upon written demand of its subcontractor, shall be required to place funds in the amount of the claim, plus interest of one per cent, in an interest-bearing escrow account in a bank in this State, provided the general contractor or subcontractor may refuse to place the funds in escrow on the grounds that the subcontractor has not substantially performed the work according to the terms of his or its employment. In the event that such general contractor or subcontractor refuses to place such funds in escrow, and the party making a claim against it under this section is found to have substantially performed its work in accordance with the terms of its employment in any arbitration or litigation to determine the validity of such claim, then such general contractor or subcontractor shall pay the attorney’s fees of such party. (c) No payment may be withheld from a subcontractor for work performed because of a dispute between the general contractor and another contractor or subcontractor. (d) This section shall not be construed to prohibit progress payments prior to final payment of the contract and is applicable to all subcontractors for material or labor whether they have contracted directly with the general contractor or with some other subcontractor on the work. |
| 3.2.5 | Surety Sheet: Apparent Low Bidder: Within ten (10) business days after receipt of the Letter of Intent from DAS/CS, the Apparent Low Bidder shall submit a Surety Sheet that provides information regarding the Surety Company and Agent. See Section 00 92 10 Additional Forms of this Project Manual for a template. |

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| 3.3 Certificate (of Authority): | |
| 3.3.1 | All Bidders for bids in excess of \$50,000 shall upload a signed and scanned Section 00 40 14 Certificate (of Authority) to CTsource prior to the date and time of the Bid Opening. See CTsource for a template. |
| 3.3.2 | The Apparent Low Bidder shall submit a second Certificate (of Authority) within ten (10) business days after receipt of the Letter of Intent from DAS/CS. |
| 3.4 Security Requirements for Connecticut Department of Correction (DOC) Facilities: | |
| 3.4.1 | All Bidders for Projects at a DOC Facility shall read and comply with Section 00 73 63 CT DOC Security Requirements for Contract Forces on DOC Facilities. |
| 3.4.2 | All Bidders Attending a Pre-Bid Meeting at a DOC Facility shall complete and submit the DOC "Security Background Questionnaire" as directed, and obtain approval, prior to the Pre-Bid Meeting, otherwise admission to the Pre-Bid Meeting will be denied . It is recommended that the approved form be brought as evidence of approval to attend the Pre-Bid Meeting. To find and download a copy of the Security Background Questionnaire , go to the DOC website (www.ct.gov/doc), scroll down to "Publications" and click on "Forms" then "Security Background Questionnaire". |
| 3.5 Affirmative Action Plan & Employment Information Form (DAS-45): Apparent Low Bidder | |
| 3.5.1 | For Projects greater than \$500,000 and/or Firms with 50 or more employees, the Apparent Low Bidder shall submit the Firm's Affirmative Action Plan and Employment Information Form (DAS-45) to CHRO within fifteen (15) calendar days after receipt of the "Request for the <i>Affirmative Action Plan and Employment Information Form</i> Letter" from DAS/CS. See Section 00 73 38 Commission on Human Rights and Opportunities/ Contract Compliance Regulations . |
| 3.5.2 | The Apparent Low Bidder shall submit a copy of the Transmittal Letter to the DAS/CS Office of Legal Affairs, Policy, and Procurement within fifteen (15) calendar days after receipt of the "Request for the <i>Affirmative Action Plan and Employment Information Form</i> Letter" from DAS/CS. |
| 3.6 Prevailing Wage: Apparent Low Bidder | |
| 3.6.1 | The Apparent Low Bidder shall submit the " Contractor's Wage Certification Form " to the Connecticut Department of Labor within fifteen (15) calendar days after receipt of the "Request for the <i>Affirmative Action Plan and Employment Information Form</i> Letter" from DAS/CS. See Section 00 73 44 Prevailing Wage Rates/Contractor's Wage Certification/Payroll Certification of this Project Manual. |
| 3.6.2 | Each contractor who is awarded a contract on or after October 1, 2002 shall be subject to provisions of C.G.S. § 31-53, as revised . See Section 00 73 44 Prevailing Wage Rates/Contractor's Wage Certification/Payroll Certification of this Project Manual. |
| 3.6.3 | Annual Adjustment Of Prevailing Wage Rates: In determining bid price, consideration should be given to C.G.S. § 31-53 and 31-55a, as revised , regarding annual adjustment of prevailing wage rates . Annual adjustments of prevailing wage rates will not be considered a matter for a contract amendment. |
| 3.7 General Permit for the Discharge of Stormwater & Dewatering Wastewaters from Construction Activities: Apparent Low Bidder | |
| 3.7.1 | All DAS/CS construction projects disturbing one or more total acres of land area on a site regardless of project phasing must file a Connecticut Department of Energy and Environmental Protection (DEEP) General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities (DEEP-WPED-GP-015) ("Construction Stormwater General Permit") registration and Stormwater Pollution Control Plan (SPCP) with the DEEP. The DAS/CS Architect/Engineer (A/E) shall be responsible for registering the Construction Stormwater General Permit and SPCP through the online DEEP ezFile Portal prior to bidding. |
| 3.7.2 | Once the Apparent Low Bidder is under contract with DAS/CS, and prior to the commencement of any construction activities, the Apparent Low Bidder ("Contractor") shall be required to provide the necessary information from all applicable contractors and/or subcontractors working on the Project to the DAS/CS A/E in order to finalize the SPCP and transfer the Construction Stormwater General Permit obligations to the Contractor. |
| 3.7.3 | All Contractors and Subcontractors listed on the SPCP shall be required to sign the SPCP "Contractor Certification Statement" and License Transfer Form prior to commencement of any construction activity. |

3.8 Section 00 52 73 Subcontract Agreement Forms: Apparent Low Bidder

3.8.1 The **Apparent Low Bidder** shall submit a completed **Section 00 52 73 Subcontract Agreement Form** of this Project Manual for *each* Named Subcontractor within **ten (10) Business Days** after receipt of the "Letter of Intent" from DAS/CS. This information *shall* be considered as part of the **Bid Proposal Form** and failure to comply with any portion of this requirement *may* cause **rejection** of the bid.

3.8.2 Each **Named Subcontractor** shall be the matter of a **Subcontract** as required by **C.G.S. § 4b-96**.

3.9 Non-Resident Contractors and Taxation: Apparent Low Bidder

3.9.1 **Nonresident contractors** must comply with the **provisions C.G.S. § 12-430 (7), Procedures for Nonresident Contractors**, and the regulations established pursuant to that section. See **Section 00 92 30 Procedures Regarding Taxation for Nonresident General/Prime Contractor and Subcontractors** of this Project Manual for additional details.

3.9.2 **Apparent Low Bidder who is a Nonresident Contractor:** Within **ten (10) business days after** receipt of the "Letter of Intent" from DAS/CS, a certificate(s) from DRS must be provided which evidences that C.G.S. §12-430 for non-resident contractors has been met. As described in Section 00 92 30 "Procedures Regarding Taxation for Nonresident General/Prime Contractor and Subcontractors", **Verified Nonresident** General/Prime Contractors must submit a copy of their "**Notice of Verified Status**" (Verification Letter) from DRS. **Unverified Nonresident** General/Prime Contractors must submit a copy of **Form AU-965 "Acceptance of Surety Bond"** from DRS.

3.10 Certificate of Legal Existence: Apparent Low Bidder

3.10.1 A **corporation** that is awarded the contract must comply with the laws of this State regarding the procurement of a certificate of authority to transact business in this State from the **Secretary of the State**. A "**Certificate of Legal Existence**" which is not older than **ninety (90) calendar days** from the date of the contract signing must be filed with the DAS/CS Office of Legal Affairs, Policy, and Procurement within **ten (10) business days after** receipt of the "Letter of Intent" from DAS/CS.

3.11 State Election Enforcement Commission (SEEC) Form 10: Apparent Low Bidder

3.11.1 The **Apparent Low Bidder** shall submit a **State Election Enforcement Commission's (SEEC) Form 10** "Notice to Executive Branch State Contractors and Prospective State Contractors of Campaign Contribution and Solicitation Limitations" within **ten (10) business days after** receipt of the "Letter of Intent" from DAS/CS for contracts with a value of \$50,000 or more.

3.11.2 Pursuant to C.G.S. § 9-612, as revised, a State Contract means an agreement or contract with the state or any state agency or any quasi-public agency having a value in a calendar year of **\$50,000** or more, or a combination or series of such **agreements** or **contracts** having a value of **\$100,000** or more, the **authorized signatory** to this **submission** in response to the State's solicitation expressly **acknowledges receipt** of, and must submit **in writing**, the **SEEC Form 10 notice** advising prospective state contractors of the state campaign contribution and solicitation prohibitions, and will inform its principals of the contents of the **notice**.

3.11.3 To find and download a copy of **SEEC Form 10**, go to the SEEC website (www.ct.gov/seec), scroll down to "Resources", and click on the following links: Forms > Contractor Reporting Forms > "SEEC Form 10" and follow the directions.

3.12 OSHA Training Course: Successful Bidder

3.12.1 Pursuant to **C.G.S. §. 31-53b (a)**, as revised, each contract entered into for the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public building project by the state or any of its agents, or by any political subdivision of the state or any of its agents, where the total cost of all work to be performed by all contractors and subcontractors in connection with the contract is at least **one hundred thousand dollars (\$100,000)**, shall contain a provision requiring that, not later than **thirty (30) days** after the date such contract is awarded, **each contractor furnish proof to the Labor Commissioner** that all employees performing manual labor on or in such public building, pursuant to such contract, have completed a **course of at least ten (10) hours** in duration in **construction safety and health** approved by the federal Occupational Safety and Health Administration or, in the case of telecommunications employees, have completed at **least ten (10) hours** of training in accordance with 29 CFR 1910.268.

3.13 UPDATED: Contractor and Subcontractor Payments Reporting now in PMWeb: Successful Bidder

3.13.1 For compliance with **C.G.S. § 4b-95 and 49-41a**, DAS/CS requires every Contractor (and its Subcontractors and their Subcontractors) who has been awarded a DAS/CS construction contract to log on to the State of Connecticut web-based platform, **PMWeb**, **each month** and **enter payments** they have received from the state, from the Contractor, or from a higher tier Subcontractor (as applicable).

The process is described as follows: After the state has made payment to the Contractor for work performed (and purchases made) by it and its Subcontractors, the Contractor will input the payment date and amount they receive from the state on a monthly basis. The Contractor's first-level Subcontractor (Tier 1 Subcontractor) will input the payment they receive from the Contractor. The second-level Subcontractor (Tier 2 Subcontractor) will input the payment they receive from the Tier 1 Subcontractor. And so on.

Contractors awarded a DAS/CS construction contract shall contain a **provision in their subcontract agreements** requiring their Subcontractors to enter payment receipt from the Contractor in the State of Connecticut web-based platform, **PMWeb**, for work performed or purchases made in relation to state projects.

Detailed instructions can be found in the DAS/CS publication, **6002 Instructions to Contractors/Subcontractors for Entering Payments Online**, available for download from the online DAS/CS Library (<http://portal.ct.gov/DASCSLibrary>) > 6000 Series.

4.0 Nondiscrimination and Affirmative Action

This contract is subject to Federal and state laws, including Title VII of the 1964 Civil Rights Act, 42 U.S.C. § 2000e-2(a)(1), and the Connecticut Fair Employment Practices Act. C.G.S. § 46a-60 et seq., prohibit various forms of discrimination and illegal harassment in employment.

4.1 Nondiscrimination and Affirmative Action Provisions:

4.1.1 This section is inserted in connection with C.G.S. § 4a-60, as revised.

4.1.2 References in this section to "contract" **shall** mean this Contract and references to "contractor" **shall** mean the Contractor/Bidder.

4.1.3 C.G.S. § 4a-60, as revised:

(a) Except as provided in section 10a-151i, every contract to which an awarding agency is a party, every quasi-public agency project contract and every municipal public works contract shall contain the following provisions:

(1) The contractor agrees and warrants that in the performance of the contract such contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, status as a veteran, intellectual disability, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the state of Connecticut; and the contractor further agrees to take affirmative action to ensure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, status as a veteran, intellectual disability, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability prevents performance of the work involved;

(2) The contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of the contractor, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the Commission on Human Rights and Opportunities;

(3) The contractor agrees to provide each labor union or representative of workers with which such contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such contractor has a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities advising the labor union or workers' representative of the contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment;

(4) The contractor agrees to comply with each provision of this section and sections 46a-68e and 46a-68f and with each regulation or relevant order issued by said commission pursuant to sections 46a-56, 46a-68e, 46a-68f and 46a-86; and

(5) The contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the contractor as relate to the provisions of this section and section 46a-56.

(b) If the contract is a public works contract, municipal public works contract or contract for a quasi-public agency project, the contractor agrees and warrants that he or she will make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials on such public works or quasi-public agency project.

(c) Except as provided in section 10a-151i:

(1) Any contractor who has one or more contracts with an awarding agency or who is a party to a municipal public works contract or a contract for a quasi-public agency project, where any such contract is valued at less than fifty thousand dollars for each year of the contract, shall provide the awarding agency, or in the case of a municipal public works or quasi-public agency project contract, the Commission on Human Rights and Opportunities, with a written or electronic representation that complies with the nondiscrimination agreement and warranty under subdivision (1) of subsection (a) of this section, provided if there is any change in such representation, the contractor shall provide the updated representation to the awarding agency or commission not later than thirty days after such change.

(2) Any contractor who has one or more contracts with an awarding agency or who is a party to a municipal public works contract or a contract for a quasi-public agency project, where any such contract is valued at fifty thousand dollars or more for any year of the contract, shall provide the awarding agency, or in the case of a municipal public works or quasi-public agency project contract, the Commission on Human Rights and Opportunities, with any one of the following:

(A) Documentation in the form of a company or corporate policy adopted by resolution of the board of directors, shareholders, managers, members or other governing body of such contractor that complies with the nondiscrimination agreement and warranty under subdivision (1) of subsection (a) of this section;

(B) Documentation in the form of a company or corporate policy adopted by a prior resolution of the board of directors, shareholders, managers, members or other governing body of such contractor if (i) the prior resolution is certified by a duly authorized corporate officer of such contractor to be in effect on the date the documentation is submitted, and (ii) the head of the awarding agency, or a designee, or in the case of a municipal public works or quasi-public agency project contract, the executive director of the Commission on Human Rights and Opportunities or a designee, certifies that the prior resolution complies with the nondiscrimination agreement and warranty under subdivision (1) of subsection (a) of this section; or

(C) Documentation in the form of an affidavit signed under penalty of false statement by a chief executive officer, president, chairperson or other corporate officer duly authorized to adopt company or corporate policy that certifies that the company or corporate policy of the contractor complies with the nondiscrimination agreement and warranty under subdivision (1) of subsection (a) of this section and is in effect on the date the affidavit is signed.

(3) No awarding agency, or in the case of a municipal public works contract, no municipality, or in the case of a quasi-public agency project contract, no entity, shall award a contract to a contractor who has not provided the representation or documentation required under subdivisions (1) and (2) of this subsection, as applicable. After the initial submission of such representation or documentation, the contractor shall not be required to resubmit such representation or documentation unless there is a change in the information contained in such representation or documentation. If there is any change in the information contained in the most recently filed representation or updated documentation, the contractor shall submit an updated representation or documentation, as applicable, either (A) not later than thirty days after the effective date of such change, or (B) upon the execution of a new contract with the awarding agency, municipality or entity, as applicable, whichever is earlier. Such contractor shall also certify, in accordance with subparagraph (B) or (C) of subdivision (2) of this subsection, to the awarding agency or commission, as applicable, not later than fourteen days after the twelve-month anniversary of the most recently filed representation, documentation or updated representation or documentation, that the representation on file with the awarding agency or commission, as applicable, is current and accurate.

(d) For the purposes of this section, "contract" includes any extension or modification of the contract, "contractor" includes any successors or assigns of the contractor, "marital status" means being single, married as recognized by the state of Connecticut, widowed, separated or divorced, and "mental disability" means one or more mental disorders, as defined in the most recent edition of the American Psychiatric Association's "Diagnostic and Statistical Manual of Mental Disorders", or a record of or regarding a person as having one or more such disorders. For the purposes of this section, "contract" does not include a contract where each contractor is (1) a political subdivision of the state, including, but not limited to, a municipality, unless the contract is a municipal public works contract or quasi-public agency project contract, (2) any other state, as defined in section 1-267, (3) the federal government, (4) a foreign government, or (5) an agency of a subdivision, state or government described in subdivision (1), (2), (3) or (4) of this subsection.

(e) For the purposes of this section, "minority business enterprise" means any small contractor or supplier of materials fifty-one per cent or more of the capital stock, if any, or assets of which is owned by a person or persons: (1) Who are active in the daily affairs of the enterprise, (2) who have the power to direct the management and policies of the enterprise, and (3) who are members of a minority, as such term is defined in subsection (a) of section 32-9n; and "good faith" means that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations. "Good faith efforts" shall include, but not be limited to, those reasonable initial efforts necessary to comply with statutory or regulatory requirements and additional or substituted efforts when it is determined that such initial efforts will not be sufficient to comply with such requirements.

(f) Determination of the contractor's good faith efforts shall include, but shall not be limited to, the following factors: The contractor's employment and subcontracting policies, patterns and practices; affirmative advertising, recruitment and training;

technical assistance activities and such other reasonable activities or efforts as the Commission on Human Rights and Opportunities may prescribe that are designed to ensure the participation of minority business enterprises in public works projects.

(g) The contractor shall develop and maintain adequate documentation, in a manner prescribed by the Commission on Human Rights and Opportunities, of its good faith efforts.

(h) The contractor shall include the provisions of subsections (a) and (b) of this section in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the state, and in every subcontract entered into in order to fulfill any obligation of a municipal public works contract or contract for a quasi-public agency project, and such provisions shall be binding on a subcontractor, vendor or manufacturer, unless exempted by regulations or orders of the Commission on Human Rights and Opportunities. The contractor shall take such action with respect to any such subcontract or purchase order as the commission may direct as a means of enforcing such provisions, including sanctions for noncompliance in accordance with section 46a-56; provided, if such contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the commission regarding a state contract, the contractor may request the state of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the state and the state may so enter.

4.2 Nondiscrimination Provisions Regarding Sexual Orientation:

4.2.1 This section is inserted in connection with C.G.S. § 4a-60a, as revised.

4.2.2 References in this section to "contract" shall mean this Contract and references to "contractor" shall mean the Contractor/Bidder.

4.2.3 C.G.S. § 4a-60a, as revised:

(a) Except as provided in section 10a-151i, every contract to which an awarding agency is a party, every contract for a quasi-public agency project and every municipal public works contract shall contain the following provisions:

(1) The contractor agrees and warrants that in the performance of the contract such contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or of the state of Connecticut, and that employees are treated when employed without regard to their sexual orientation;

(2) The contractor agrees to provide each labor union or representative of workers with which such contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such contractor has a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities advising the labor union or workers' representative of the contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment;

(3) The contractor agrees to comply with each provision of this section and with each regulation or relevant order issued by said commission pursuant to section 46a-56; and

(4) The contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the contractor which relate to the provisions of this section and section 46a-56.

(b) Except as provided in section 10a-151i:

(1) Any contractor who has one or more contracts with an awarding agency or who is a party to a municipal public works contract or a contract for a quasi-public agency project, where any such contract is valued at less than fifty thousand dollars for each year of the contract, shall provide the awarding agency, or in the case of a municipal public works or quasi-public agency project contract, the Commission on Human Rights and Opportunities, with a written representation that complies with the nondiscrimination agreement and warranty under subdivision (1) of subsection (a) of this section.

(2) Any contractor who has one or more contracts with an awarding agency or who is a party to a municipal public works contract or a contract for a quasi-public agency project, where any such contract is valued at fifty thousand dollars or more for any year of the contract, shall provide such awarding agency, or in the case of a municipal public works or quasi-public agency project contract, the Commission on Human Rights and Opportunities, with any of the following:

(A) Documentation in the form of a company or corporate policy adopted by resolution of the board of directors, shareholders, managers, members or other governing body of such contractor that complies with the nondiscrimination agreement and warranty under subdivision (1) of subsection (a) of this section;

(B) Documentation in the form of a company or corporate policy adopted by a prior resolution of the board of directors, shareholders, managers, members or other governing body of such contractor if (i) the prior resolution is certified by a duly authorized corporate officer of such contractor to be in effect on the date the documentation is submitted, and (ii) the head of the awarding agency, or a designee, or in the case of a municipal public works or quasi-public agency project contract, the executive director of the Commission on Human Rights and Opportunities or a designee, certifies that the prior resolution complies with the nondiscrimination agreement and warranty under subdivision (1) of subsection (a) of this section; or

(C) Documentation in the form of an affidavit signed under penalty of false statement by a chief executive officer, president, chairperson or other corporate officer duly authorized to adopt company or corporate policy that certifies that the company or corporate policy of the contractor complies with the nondiscrimination agreement and warranty under subdivision (1) of subsection (a) of this section and is in effect on the date the affidavit is signed.

(3) No awarding agency, or in the case of a municipal public works contract, no municipality, or in the case of a quasi-public agency project contract, no entity, shall award a contract to a contractor who has not provided the representation or documentation required under subdivisions (1) and (2) of this subsection, as applicable. After the initial submission of such representation or documentation, the contractor shall not be required to resubmit such representation or documentation unless there is a change in the information contained in such representation or documentation. If there is any change in the information contained in the most recently filed representation or updated documentation, the contractor shall submit an updated representation or documentation, as applicable, either (A) not later than thirty days after the effective date of such change, or (B) upon the execution of a new contract with the awarding agency, municipality, or entity, as applicable, whichever is earlier. Such contractor shall also certify, in accordance with subparagraph (B) or (C) of subdivision (2) of this subsection, to the awarding agency or commission, as applicable, not later than fourteen days after the twelve-month anniversary of the most recently filed representation, documentation or updated representation or documentation, that the representation on file with the awarding agency or commission, as applicable, is current and accurate.

(c) For the purposes of this section, "contract" includes any extension or modification of the contract, and "contractor" includes any successors or assigns of the contractor. For the purposes of this section, "contract" does not include a contract where each contractor is (1) a political subdivision of the state, including, but not limited to, a municipality, unless the contract is a municipal public works contract or quasi-public agency project contract, (2) any other state, as defined in section 1-267, (3) the federal government, (4) a foreign government, or (5) an agency of a subdivision, state or government described in subdivision (1), (2), (3) or (4) of this subsection.

(d) The contractor shall include the provisions of subsection (a) of this section in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the state, and in every subcontract entered into in order to fulfill any obligation of a municipal public works contractor contract for a quasi-public agency project, and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the Commission on Human Rights and Opportunities. The contractor shall take such action with respect to any such subcontract or purchase order as the commission may direct as a means of enforcing such provisions, including sanctions for noncompliance in accordance with section 46a-56; provided, if such contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the commission regarding a state contract, the contractor may request the state of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the state and the state may so enter.

**End of Section
00 21 13 Instructions to Bidders**

Pre-Bid Meeting Agenda:

DAS ● Construction Services ● Office of Legal Affairs, Policy, and Procurement

1.0 Pre-Bid Meeting:

1.1 The Owner, Architect and Construction Administrator will conduct a Pre-Bid Meeting. For the Pre-Bid Meeting Date, Time, and Location see Section 00 11 16 Invitation To Bid for this Specific Bid.

1.2 Attendance:

| | | |
|--------------|---------------------------------------|---|
| 1.2.1 | General Contractor: | Attendance at the Pre-Bid Meeting is MANDATORY . At the Pre-Bid Meeting, all prospective bidders shall <i>sign</i> his or her name on the official roster and <i>list</i> the name and address of the company he or she represents. For MANDATORY Pre-Bid Meetings, this shall be done no later than the designated start time of the Pre-Bid Meeting. Prospective bidders are advised to register early as no attendee will be allowed to register <i>after</i> the advertised start time. Bids submitted by contractors who have <i>not properly</i> registered and attended the MANDATORY Pre-Bid Meeting <i>shall be rejected</i> as non-responsive . |
| 1.2.2 | Subcontractors: | Attendance at the Pre-Bid Meeting is recommended. |
| 1.2.3 | Pre-Bid Meeting Sign-in Sheet: | It is MANDATORY that all attendees sign the Pre-Bid Meeting Sign-in Sheet . |

1.3 Site/Facility Visit or Walkthrough: Please **do not** make any Site/Facility Visits without notifying the DAS/CS Project Manager prior to your visit.

| | | |
|--------------|-------------------------------------|---|
| 1.3.1 | <input checked="" type="checkbox"/> | A Site/Facility Visit or Walkthrough is scheduled for the Pre-Bid Meeting |
| 1.3.2 | <input type="checkbox"/> | A Site/Facility Visit or Walkthrough is <u>NOT</u> scheduled for the Pre-Bid Meeting |

1.4 Bidder Questions:

1.4.1 Submit **written** questions to be discussed at the **Pre-Bid Meeting** a **minimum of two (2) Calendar Days prior to Pre-Bid Meeting date**. See the **Invitation to Bid** for instructions on submitting questions.

IMPORTANT NOTE: In accordance with DAS Regulations, **no** participants in any Selection, Proposal, or Bidding process, including User Agency representative(s), shall communicate with any potential Offeror prior to, during, or upon conclusion of the entire Selection, Proposal, or Bidding procedure, with the exception of information necessary to complete the administrative steps of the Selection process.

2.0 Pre-Bid Meeting Agenda:

The Pre-Bid Meeting Agenda will include a review of topics, **as applicable to the Project**, which may affect proper preparation and submittal of bids, including, but not limited to, the following:

2.1 Introduction of Participants:

| | |
|--------------|---|
| 2.1.1 | Architect/Engineer: TLB Architecture, LLC |
| 2.1.2 | CA: Atane Consulting |
| 2.1.3 | DAS Representative: Ira Henowitz, RA; DAS Project Manager |
| 2.1.4 | Agency Representative: Eric Ott, DEEP Director of Engineering and Field Services |

2.0 Pre-Bid Meeting Agenda (continued):

| | |
|------------|---|
| 2.2 | Project Summary: |
| 2.2.1 | Summary of Work: See General Requirements Section 01 11 00 |
| 2.2.2 | Temporary Facilities and Controls: See General Requirements Section 01 50 00 |
| 2.2.3 | Work Sequence: See General Requirements Section 01 11 00 |
| 2.2.4 | Contractor Use of Premises: See General Requirements Section 01 11 00 |
| 2.2.5 | Project Schedule |
| 2.2.6 | Contract Time |
| 2.2.7 | Liquidated Damages: See General Conditions Section 00 73 13, Articles 1 and 8, and 00 41 00 Bid Proposal Form. |

| | |
|------------|--|
| 2.3 | Procurement and Contracting Requirements: |
| 2.3.1 | Section 00 11 16 – Invitation to Bid |
| 2.3.2 | Section 00 21 13 – Instructions to Bidders |
| 2.3.3 | Section 00 41 00 – Bid Proposal Form |
| 2.3.4 | Section 00 41 10 – Bid Package Submittal Requirements |
| 2.3.5 | Section 00 30 00 – General Statements for Available information |
| 2.3.6 | Division 50 – Project-Specific Available Information |
| 2.3.7 | Bonding |
| 2.3.8 | Insurance |
| 2.3.9 | Bid Security |
| 2.3.10 | Notice of Award |

| | |
|------------|--|
| 2.4 | Communication During Bidding Period: |
| 2.4.1 | Obtaining Bid Documents from CTsource (Detailed instructions for responding to a DAS Construction Services Solicitation can be found in <i>6001 Construction Online Bidding Instructions</i> , available for download from the DAS/CS Library https://portal.ct.gov/DASCSLibrary > 6000 Series.) |
| 2.4.2 | Access to DAS Website, DAS/CS Forms, CTsource, and BizNet: DAS Website: https://portal.ct.gov/DAS DAS Construction Services Forms: https://portal.ct.gov/DASCSLibrary CTsource Homepage: https://portal.ct.gov/DAS/CTSource/ctsource CTsource Registration: https://portal.ct.gov/DAS/CTSource/Registration DAS Construction Services Bid Board: https://portal.ct.gov/DAS/Construction-Services/BidBoard . DAS Construction Services Contracts: https://portal.ct.gov/DAS/CTSource/ContractBoard (filter by DAS Construction Services under "Organizations"). BizNet: https://biznet.ct.gov/SCP_Search/default.aspx?Src=CISplash |
| 2.4.3 | Bidder's Requests for Information: See General Requirements Sections 01 26 00 |
| 2.4.4 | Substitution Procedures (Prior to Bid): See General Requirements Section 01 25 00 & General Conditions Section 00 73 13, Article 15. The Owner will consider Pre-Bid Equals or Substitutions Requests, if made fourteen (14) Calendar Days prior to the Bid Due Date . The information on all materials shall be consistent with the information herein. |
| 2.4.5 | Substitutions following Contract Award: See General Requirements Section 01 25 00 & General Conditions Section 00 73 13, Article 15. Subject to the Architect or Engineer's determination, if the material or equipment is Equal to the one specified or pre-qualified and the DAS/CS Project Manager's approval of such determination, Substitution of Material or Equipment may be allowed after the Letter of Award is issued, as specified in the Conditions Section 00 73 13, Article 15. |
| 2.4.6 | Addenda Procedures: See Item No. 2.7 of this form |

2.0 Pre-Bid Meeting Agenda (continued):

2.5 Contract Considerations:

- 2.5.1 **Allowances:** See General Requirements Section 01 20 00
- 2.5.2 **Unit Prices:** See General Requirements Section 01 20 00
- 2.5.3 **Supplemental Bid:** See General Requirements Section 01 23 13 and 00 41 00 Bid Proposal Form.

2.6 Separate Contracts:

- 2.6.1 **Work by Owner**
- 2.6.2 **Work of Other Contracts**

2.7 Post Pre-Bid Meeting Addendum:

- 2.7.1 **No Interpretations** of the meaning of the plans, specifications or other contract documents will be made orally at any time. Every bidder **request** for such interpretation **shall** be in writing to the awarding authority and to be given consideration **shall** be received at least **fourteen (14)** Calendar Days **prior** to the Bid Due Date. Any and all such **interpretations** and any **supplemental instructions** will be in the form of written **addenda** to the specifications which, *if* issued, will be posted on **CTsource**.
- 2.7.2 **Other Bidder Questions**

2.8 Other Agenda Topics and Notes:

- 2.8.1 LEED and High-Performance Building Criteria
- 2.8.2 Requirements for working in an occupied Park
- 2.8.3 Coordination of Site Utilities

3.0 Pre-Bid Meeting Minutes:

3.1 Recording and Distribution of Pre-Bid Meeting Minutes:

- 3.1.1 The **Architect** is responsible for conducting the Pre-Bid Meeting and will record and distribute meeting minutes to attendees and others known by the issuing office to have received a complete set of Procurement and Contracting Documents.

3.2 Pre-Bid Meeting Minutes as “Available Information”

- 3.2.1 Minutes of the Pre-Bid Meeting are issued as “Available Information” and **do not** constitute a modification to the Procurement and Contracting Documents. **Modifications to the Procurement and Contracting Documents are issued by written Addendum only.**

3.3 Pre-Bid Meeting Sign-in Sheet:

- 3.3.1 Minutes will include the list of meeting attendees.

3.4 List of Planholders:

- 3.4.1 Minutes will include the list of planholders.

End of Section
00 25 13 Pre-Bid Meeting Agenda

00 30 00 GENERAL STATEMENTS FOR AVAILABLE INFORMATION NOT USED

- A. **Summary:** This Section is not a Bidding Document, but directs Bidders to **Division 50 00 00 Project-Specific Available Information** that provides project-specific information available for review by Bidders.
- B. **Bidder Responsibility:** The Bidder is responsible for information, including but not limited to, any interpretations and opinions of information contained in any plans, reports, evaluations, and logs, or shown on any drawings, or indicated on any drawings. **Division 50 00 00 Project-Specific Available Information** is provided to Bidders for their use in the preparation of a Bid.
- C. **Measurement:** **Division 50 00 00 Project-Specific Available Information** shall be utilized for determination of payment for the Work during construction of the project.
- D. **Payment:** No separate payment will be made for any Work under **Division 50 00 00 Project-Specific Available Information**.
- E. **Related Sections:** Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section. **See Division 50 00 00 Project-Specific Available Information** for information that is available for this Project.
- F. Please read the following **General Statement(s)** that describe the type of project-specific information that is available in **Division 50 00 00 Project-Specific Available Information**:

| 00 30 00 | General Statements For Available Information Table Of Contents | Not Used |
|------------|---|-------------------------------------|
| 00 30 10 | General Statement for Existing Conditions Survey | <input checked="" type="checkbox"/> |
| 00 30 20 | General Statement for Environmental Assessment Information | <input type="checkbox"/> |
| 00 30 30 | General Statement for Hazardous Building Materials Inspection and Inventory | <input checked="" type="checkbox"/> |
| 00 30 40 | General Statement for Subsurface Geotechnical Report | <input type="checkbox"/> |
| 00 30 50 | General Statement for Elevator Agreement | <input type="checkbox"/> |
| 00 30 60 | General Statement for FM Global Checklist for Roofing Systems | <input type="checkbox"/> |
| 00 30 70 | General Statement for "Statement of Special Inspections" | <input type="checkbox"/> |
| 00 30 80.1 | General Statement for "Geothermal Well Conductivity Testing" | <input type="checkbox"/> |
| 00 30 80.2 | DEEP Flood Management Certificate Permit Conditions | <input type="checkbox"/> |

00 30 10 GENERAL STATEMENT FOR EXISTING CONDITIONS SURVEY

Not Used

00 30 20 GENERAL STATEMENT FOR ENVIRONMENTAL ASSESSMENT INFORMATION

Not Used

A. Related Documents:

Section 01 20 00 Contract Considerations

Section 01 50 00 Temporary Facilities and Controls

Section 31 10 00 Site Clearing

Section 31 20 00 Earth Moving

Division 50 00 00 Project-Specific Additional Information

B. Definitions:

1. Clean Fill: Either (1) natural soil or (2) rock, brick, ceramics, concrete, and asphalt paving fragments which are virtually inert and pose neither a pollution threat to ground or surface waters nor a fire hazard.
2. Contaminated Soil: Treated or untreated soil and/or sediment affected by a known or suspected release and determined, or reasonably expected to contain substances exceeding Residential Direct Exposure Criteria or GA Pollutant Mobility Criteria, as these terms are defined in the Remediation Standard Regulations (RCSA Section 22a-133k-1).
3. Hazardous Soil: Soil that is classified as a hazardous waste. Soil is classified as hazardous waste if it exhibits a hazardous waste characteristic or if it contains RCRA-listed hazardous constituents above Connecticut's RCRA "Contained-In" Policy dated May 2002.
4. Natural Soil: Soil in which all substances naturally occurring therein are present in concentrations not exceeding the concentrations of such substance occurring naturally in the environment and in which soil no other substance is analytically detectable.
5. Polluted Soil: Soil affected by a release of a substance at a concentration above the analytical detection limit for such substance in accordance with RCSA 22a-133k-1(a)(45) or for naturally occurring substance at a concentration that exceeds concentrations that naturally occur in the environment.
6. Regulated Soil: Includes Polluted Soil, Contaminated Soil, and Hazardous Soil.
7. Groundwater Remediation Wastewater: Wastewater generated in connection with investigating pollution or remediating polluted groundwater or soil. Groundwater remediation wastewater includes without limitation groundwater withdrawn from a groundwater recovery well; groundwater which collects in an excavation or foundation drain or other subsurface facility or structure; groundwater contaminated runoff and stormwater impacted by on-site pollutants from any construction activity; condensate resulting from construction or maintenance of a soil vapor extraction system; and wastewater generated by developing, testing, sampling, or purging a well.

C. Description of Work:

1. Natural Diversity Database:

- 1.1 Connecticut Department of Energy & Environmental Protection performed a review of the Natural Diversity Data Base maps and files regarding the proposed project and based on their information there are known extant populations of State Threatened northern spring salamander (*Gyrinophilus porphyriticus*) and State Special Concern wood turtle (*Glyptemys insculpta*), smooth green snake (*Opheodrys vernalis*) and hairy-fruited sedge (*Carex trichocarpa*) in the project area. The review was summarized in a letter dated February 23, 2019, from Dawn M. McKay, Environmental Analyst 3, Project: Construction of a New LEED DEEP Western District Headquarters with Two Parking Areas at 2065 Thomaston Road, Watertown, Connecticut. NDDB Determination No.: 201813885. This NDDB request must be resubmitted if the scope of work changes or if work has not begun on this project by February 23, 2021.

| | | |
|----------|--|--|
| 00 30 30 | GENERAL STATEMENT FOR HAZARDOUS BUILDING MATERIALS INSPECTION AND INVENTORY | Not Used <input checked="" type="checkbox"/> |
|----------|--|--|

| | | |
|----------|---|-----------------------------------|
| 00 30 40 | GENERAL STATEMENT FOR SUBSURFACE GEOTECHNICAL REPORT | Not Used <input type="checkbox"/> |
|----------|---|-----------------------------------|

- A. **Related Documents:**
 - 1. **Division 31-33 - Site Construction.**

- B. **Description of Work:**
 - 1. **Boring Logs:**
 - 1.1 The Boring Logs have been prepared for the site of this Work and are in the Contract Documents.
 - 2. **Geotechnical Report(s):**
 - 2.1 The Subsurface Geotechnical Report(s) has been prepared for the site of this Work and is located in **Division 50 00 00 Project-Specific Available Information, Section 50 40 00 Subsurface Geotechnical Report** at the end of the Technical Specification Sections.
 - 2.2 The Contractor must interpret this report according to his own judgment and acknowledges that he is not relying upon the data as accurately describing the subsurface conditions which may be found to exist.
 - 2.3 The Contractor further acknowledges that he assumes all risk contingents upon the nature of the subsurface conditions which shall be actually encountered by him in performing the Work of this Contract.
 - 2.4 The Contractor should visit the site and become acquainted with all existing conditions and may make their own subsurface investigations to satisfy themselves as to the subsurface conditions. Such investigations shall be conducted only under time schedules and arrangements approved in advance by the Owner.

| | | |
|----------|---|-----------------------------------|
| 00 30 50 | GENERAL STATEMENT FOR ELEVATOR AGREEMENT | Not Used <input type="checkbox"/> |
|----------|---|-----------------------------------|

- A. **Related Documents:**
 - 1. **Division 14: Section 14 21 23 Machine Room-less Hydraulic Elevators**

- B. **Description of Work:**
 - 1. **Elevator:**
 - 1.1 The Work of this Project includes an Elevator(s).
 - 2. **Elevator Agreement:**
 - 2.1 This Project contains elevator specifications that mandate that the general contractor must obtain a signed copy of the Elevator Agreement from the elevator manufacturer prior to their submittal of elevator shop drawings for review. Failure to receive a signed agreement will result in an automatic rejection of the submittal.
 - 2.2 The Elevator Agreement is located in **Division 50 00 00 Project-Specific Available Information, Section 50 50 00 Elevator Agreement** at the end of the Technical Specification Sections.

00 30 60 GENERAL STATEMENT FOR FM GLOBAL CHECKLIST FOR ROOFING SYSTEMS Not Used

- A. Related Documents:**
1. **Section 07 41 13 Standing Seam Metal Roof Panels**
 2. **Section 07 53 23 Ethylene-Propylene-Diene-Monomer (EPDM) Roofing**
- B. Description of Work:**
1. Work Involving FM Global requirements for Existing Roof Removal and Replacement With New Roof:
 - 1.1 The Contractor shall be responsible for adhering to FM Global Checklist Requirements for Roof Work. .
 - 1.2 Refer to the **FM Global Data Sheet Website** (<http://www.fmglobal.com/fmglobalregistration/>) and the **FM Global Roof Design / Approval Web Tool - RoofNav** (<https://roofnav.fmglobal.com/RoofNav/Login.aspx>).
 - 1.3 A sample of the FM Global Checklist is located in **Division 50 00 00 Project-Specific Available Information, 50 60 00 FM Global Checklist For Roofing Systems** at the end of the Technical Specification Sections.

00 30 70 GENERAL STATEMENT FOR "STATEMENT OF SPECIAL INSPECTIONS" Not Used

- A.** The "Statement of Special Inspections" for this project is located in **Division 50 00 00 Project-Specific Available Information, Section 50 70 00 Statement of Special Inspections** at the end of the Technical Specification Sections.

00 30 80.1 GENERAL STATEMENT FOR ADDITIONAL INFORMATION Not Used

- A. Related Documents:**
1. **Section 33 23 13 Geothermal Energy Exchange Wells**
- B. Description of Work:**
1. **Conductivity Test:**
 - 1.1 The Conductivity Test has been prepared for the site of this Work and is in the Contract Documents.
 2. **Test Results:**
 - 2.1 The Conductivity Test Repor has been prepared for the site of this Work and is located in **Division 50 00 00 Project-Specific Available Information, Section 50 80 00 Geothermal Well Conductivity Testing** at the end of the Technical Specification Sections.
 - 2.2 The Contractor must interpret this report according to his own judgment and acknowledges that he is not relying upon the data as accurately describing the subsurface conditions which may be found to exist.
 - 2.3 The Contractor further acknowledges that he assumes all risk contingents upon the nature of the subsurface conditions which shall be actually encountered by him in performing the Work of this Contract.
 - 2.4 The Contractor should visit the site and become acquainted with all existing conditions and may make their own subsurface investigations to satisfy themselves as to the sub-surface conditions. Such investigations shall be conducted only under time schedules and arrangements approved in advance by the Owner.

00 30 80.2 GENERAL STATEMENT FOR ADDITIONAL INFORMATION

Not Used

A. Related Documents:

1. **Division 31, Division 32, and Division 33 Sections**

B. Description of Work:

1. **This section contains the CT DEEP License and Flood Management Certification Approval as well as the General Permit for Resource Construction Activities – Approval of Authorization:**

1.1 *Document contains conditions of approval regarding managing construction activities related to:*

- a. *Protecting Wetlands*
- b. *Protecting certain species of fauna present at the site*

1.2 **Land and Water Resources Division General Conditions**

1.3 **General Permit for Water Resource Construction Activities**

1.4 **Compliance Certification Form**

End of Section

00 30 00 General Statements for Available Information

Certificate (of Authority)

DAS Construction Services Project No.: _____

I _____, _____
(Signer's Name)¹ (Signer's Title)

of _____, an entity lawfully organized and existing under the laws
(Name of Entity)

of _____, do hereby certify that the following is a true and correct
(Name of State or Commonwealth)

copy of a resolution adopted on the _____ day of _____, 20 _____ by the governing body of
(Day)² (Month)² (Year)²

_____, in accordance with all of its documents of governance and
(Name Of Entity)

management and the laws of _____ and further certify that such resolution has not
(Name of State or Commonwealth)

been modified, rescinded or revoked, and is at present in full force and effect.

RESOLVED: that _____, _____
(Name of Signer of Contract Documents)³ (Title of Signer of Contract Documents)³

of _____ is empowered and authorized, on behalf of the entity,
(Name of Entity)

to execute and deliver contracts and amendments thereto, and all documents required by the Governor, the Connecticut Department of Administrative Services, the Connecticut State Properties Review Board and the Office of the Attorney General associated with such contracts and amendments.

IN WITNESS WHEREOF, the undersigned has executed this certificate this _____ day of _____, 20 _____.
(Day)⁴ (Month)⁴ (Year)⁴

(Signature)

(Print Name)

(Title)

Reference Notes:

- 1 The signer of this certificate must be someone *other than* the signer of the contract documents *except for* a sole managing member of an LLC or the sole officer or sole principal of a corporation. *If* the signer is a sole managing member of an LLC, *then* along with this certificate the signer must provide a letter on company letterhead that indicates the signer is a sole member and managing member. If the signer is the sole officer or sole principal of a corporation, then the signer must provide with the certificate a letter on company letterhead setting forth this fact.
- 2 This date must be on or before the **date of signing** of the Bid Proposal (or Contract).
- 3 This person shall sign the Contract and other required documents.
- 4 This date must be on or after the **date of signing** of the Bid Proposal (or Contract).

For Your Information:

Certificate (of Authority)

All Bidders:
Complete page 1, print, sign, and scan to PDF. Upload the PDF form to CTsource.

What the **Certificate** is saying is that the organization authorized the signatory to sign the pertinent **documents other than** the Certificate (of Authority) and that, as of the date of **execution** of the CERTIFICATE (i.e., the date set forth in the "In Witness Whereof" blanks) there has been no change in that authorization.

Instructions For Completing The Certificate (of Authority)

The Certificate (of Authority) to Accompany the Bid Proposal Form:

1. **1st Paragraph:**
 - 1.1 First, enter the name and title of the individual signing the Certificate (of Authority).
 - 1.2 Second, enter the legal name of the entity (exactly as it is shown on the Secretary of State registry).
 - 1.3 Third, enter the name of the state or commonwealth the entity is registered in.
 - 1.4 Fourth, enter the date the resolution was adopted by the governing body. This **date** is **on or before** the date the **Bid Proposal** is signed.
 - 1.5 Fifth, enter the name of the state or commonwealth the entity is registered in.
2. **2nd Paragraph:**
 - 2.1 First, enter the name and title of the individual signing bid documents for the entity.
 - 2.2 Second, enter the legal name of the entity (exactly as it is shown on the Secretary of State registry).
3. **Last Paragraph:**
 - 3.1 Enter the **Witness Date**¹. This date will likely be the date of execution of the **Bid Proposal form**.

¹ This Witness Date Should Not Be Before The Date Of Execution Of The Bid Proposal.

The Certificate (of Authority) to Accompany the Contract:

1. **1st Paragraph:**
 - 1.1 First, enter the name and title of the individual signing the Certificate (of Authority).
 - 1.2 Second, enter the legal name of the entity (exactly as it is shown on the Secretary of State registry).
 - 1.3 Third, enter the name of the state or commonwealth the entity is registered in.
 - 1.4 Fourth, enter the date the resolution was adopted by the governing body. This **date** is **on or before** the date the **Contract** is signed.
 - 1.5 Fifth, enter the name of the state or commonwealth the entity is registered in.
2. **2nd Paragraph:**
 - 2.1 First, enter the name and title of the individual signing contract documents for the entity.
 - 2.2 Second, enter the legal name of the entity (exactly as it is shown on the Secretary of State registry).
3. **Last Paragraph:**
 - 3.1 Enter the **Witness Date**¹. This date will likely be the date of execution of the **Contract**.

¹ This Witness Date Should Not Be Before The Date Of Execution Of The Contract.

End of Section 00 40 14 Certificate (of Authority)

State of Connecticut
Department of Administrative Services (DAS)
Contractor Prequalification Certificate Requirements
for Projects with Construction Costs Estimated to be Greater Than \$500,000

DAS ● Construction Services ● Office of Legal Affairs, Policy, and Procurement

1.0 DAS Contractor Prequalification Certificate

1.1 Requirements:

1.1.1 All Bidders must upload a copy of their firm's current **DAS Construction Contractor Prequalification Program Certificate** to **CTsource** with their other **Bid Package Documents** for this solicitation *prior* to the date and time of the Bid Opening.

1.2 Instructions:

- 1.2.1** To find your **DAS Construction Contractor Prequalification Program Certificate**, go to the **DAS Search for Prequalified Vendors webpage**:
<https://biznet.ct.gov/PQSearch/Default.aspx>
- 1.2.2** Enter your firm's name in "Company Name or Keyword" and click "Search".
- 1.2.3** Click "Print Certificate" adjacent your firm's name.
- 1.2.4** Save the PDF of your certificate to your computer.
- 1.2.5** Upload your **DAS Construction Contractor Prequalification Program Certificate** to **CTsource** with your other **Bid Package Documents** for this solicitation *prior* to the date and time of the Bid Opening.
- 1.2.6** If you have any questions regarding your certificate (or how to become prequalified), visit the **DAS Construction Contractor Prequalification Program webpage**:
<https://portal.ct.gov/DAS/Procurement/PreQual/DAS-Construction-Contractor-Prequalification-Program>
or call the DAS/Construction Contractor Prequalification Program at **860-713-5280**.

**State of Connecticut
Department of Administrative Services (DAS)
Update (Bid) Statement Requirements
for Projects with Construction Costs Estimated to be Greater Than \$500,000**

DAS ● Construction Services ● Office of Legal Affairs, Policy, and Procurement

1.0 DAS Update (Bid) Statement

1.1 Requirements:

| | |
|--------------|--|
| 1.1.1 | <p>All Bidders must upload a copy of their firm's current DAS Update (Bid) Statement to CTsource with their other Bid Package Documents for this solicitation <i>prior</i> to the date and time of the Bid Opening.</p> <p>The Update (Bid) Statement includes information on your company and job being bid. It also indicates your company's remaining Aggregate Work Capacity (AWC). The remaining AWC is calculated by deducting the amount of ongoing bonded work from your total bonded Aggregate Work Capacity.</p> |
|--------------|--|

1.2 Instructions:

- | | |
|---------------|---|
| 1.2.1 | To create your Update (Bid) Statement , go to the BizNet login webpage : https://biznet.ct.gov/AccountMaint/Default.aspx |
| 1.2.2 | Enter your e-mail address and password, and click the "Log-In" button. |
| 1.2.3 | Click the "Doing Business With the State" link. |
| 1.2.4 | Click the "Contractor Prequalification Application" link. |
| 1.2.5 | Click the "Bid Statements" link. |
| 1.2.6 | Enter the required information. |
| 1.2.7 | Use the "Print" link to print your DAS Update (Bid) Statement . |
| 1.2.8 | Save the PDF of your certificate to your computer. |
| 1.2.9 | Upload your DAS Update (Bid) Statement to CTsource with your other Bid Package Documents for this solicitation <i>prior</i> to the date and time of the Bid Opening. |
| 1.2.10 | If you have any questions regarding your statement (or how to become prequalified), visit the DAS Construction Contractor Prequalification Program webpage (https://portal.ct.gov/DAS/Procurement/PreQual/DAS-Construction-Contractor-Prequalification-Program) or call the DAS Construction Contractor Prequalification Program at 860-713-5280 . |

Bid Proposal Form

DAS ● Construction Services ● Office of Legal Affairs, Policy, and Procurement
 450 Columbus Boulevard, Suite 1302 ● Hartford, CT 06103

| | |
|--|---|
| Date and Time of Bid Opening: | See page 1 of Section 00 11 16 Invitation To Bid. |
| Instructions for Online Bidding: (Updates are shown in yellow highlight) | Follow the instructions in <i>6001 Construction Online Bidding Instructions</i> , available for download from the online DAS/CS Library (http://portal.ct.gov/DASCSLibrary) > 6000 Series. For questions, email Mellanee Walton at Mellanee.Walton@ct.gov . |

Instructions for Completing This Bid Proposal Form:

- **Download** and **save** the Bid Proposal Form to your computer. Close the form. Open your *saved* Bid Proposal Form and type required information in **blue** boxes. (Remember to keep saving to your computer.)
- On your Word Toolbar, **click “View” then “Edit Document” or “Print Layout”** in order to edit the form.
- When your Bid Proposal Form is complete, perform a final “save” to your computer! **Print ALL pages and sign** your Bid Proposal Form. **Scan ALL** pages of your Bid Proposal Form to **PDF**. Upload the **PDF** Bid Proposal Form to **CTsource**.
- **Duly Authorized Signature:** A duly authorized representative of the Bidder or Bidder’s partnership, firm, corporation or business organization must sign the Bid Proposal Form.
- **No Facsimile Signature** is permitted. **All information below** is to be filled in by the **Bidder**.
- *If an Addendum is issued that **changes** the **Bid Proposal Form** then the **Revised Bid Proposal Form** (issued with the Addendum) **must** be uploaded instead. **If you have previously responded to the bid, select “Retract & Edit Response”.** You must **Accept the Addendum**, attach applicable documents, and re-submit your bid.*
- Upload to **CTsource** **only** the additional **Bid Package Documents, Affidavits, and Certifications** as described in **Table 1** of **Section 00 41 10 Bid Package Submittal Requirements**.
- A signed and scanned **Certificate (of Authority)**, **Section 00 40 14**, **must** be uploaded to **CTsource** **prior** to the date and time of the Bid Opening.
- *Any Bid Proposal Form* that has omitted or added items, altered the form, contains conditional, alternative, or obscure bids, or is submitted *without* the signature of the bidder or its authorized representative, **will be rejected**.
- See **Section 00 21 13 Instructions to Bidders** for additional information.

1.0 General Bid Proposal Information:

| | |
|--|---|
| Project Title: | New West District Headquarters at Black Rock State Park |
| Project Location: | 2065 Thomaston Road, Watertown, CT |
| Project Number: | BI-T-615 |
| Construction Costs: | Greater Than \$500,000 |
| Bidding Limited To : | Contractors Prequalified by DAS for General Building Construction (Group B) |
| Threshold Limits: (C.G.S. §29-276b) | This Project DOES NOT exceed Threshold Limits. |
| Set Aside Requirements: | SBE Subcontractors &/or Suppliers: 25%; MBE Subcontractors &/or Suppliers: 6.25% |
| Pre-Bid Meeting: | See Section 00 11 16 Invitation to Bid and Section 00 25 13 Pre-Bid Meeting . |
| Plans and Specifications prepared by A/E: | Mike Fortuna, TLB Architecture, LLC, 92 West Main Street, Chester, CT 06412 |

1.1 Commencement and Acceptance: (See Section 00 73 13 General Conditions, Article 4 - Commencement and Progress of Work and Article 1 - Definitions)

The Selected Bidder shall commence Work within **fourteen (14) Calendar Days** *after* receiving a “**Construction Start Date and Notice to Proceed**” by the Commissioner or authorized representative and continue for

| |
|-----|
| 365 |
| 90 |

Calendar Days for “**Substantial Completion**” of the project; **and** then continue

| |
|----|
| 90 |
|----|

Calendar Days for “**Acceptance**” of the Work.

1.2 Liquidated Damages: (See Section 00 73 13 General Conditions, Article 8 – Damages & Article 1 - Definitions)

1.2.1 Liquidated Damages – Substantial Completion:

The Selected Bidder shall be assessed \$

| |
|----------|
| 2,769.00 |
|----------|

 per **Calendar Day** *beyond* the date established for Substantial Completion of the Contract according to the **Contract Time** as defined in **Article 1.28 of Section 00 73 13 General Conditions**, and not otherwise excused or waived pursuant to the Contract Documents, as defined in **Article 1.23 of Section 00 73 13 General Conditions**.

1.2.2 Liquidated Damages – Acceptance:

The Selected Bidder shall be assessed \$

| |
|----------|
| 1,950.00 |
|----------|

 per **Calendar Day** *beyond ninety (90) days after* the date of said Substantial Completion that the Selected Bidder fails to achieve **Acceptance**, as defined in **Article 1.1 of Section 00 73 13 General Conditions** and not otherwise excused or waived as described above.

1.3 Bid Proposal Statements and Conditions: This **Bid Proposal Form** shall be submitted according to, and in compliance with, the foregoing and following statements, conditions, and/or information:

1.3.1 This Bid Proposal Form is submitted in accordance with Chapter 60 Construction And Alterations Of State Buildings, Part II Bidding And Contracts of the Connecticut General Statutes (C.G.S.), as amended, particularly C.G.S. § 4b-91(a)(5)(A) – (C), and pursuant to, and in compliance with, the **Invitation to Bid** (Section 00 11 16), the **Instructions to Bidders** (Section 00 21 13), the **Bid Package Submittal Requirements** (Section 00 41 10), and the **Contract** (Section 00 52 03).

1.3.2 The Bidder proposes to furnish the labor and/or materials, installed as required for the Project named and numbered on this **Bid Proposal Form**, submitted herein, furnishing all necessary equipment, machinery, tools, labor and other means of construction, and all materials specified in the manner and at the time prescribed strictly in accordance with the provisions of the **Contract** including, but not limited to, the specifications and/or drawings together with all **Addenda** issued by the Awarding Authority and received by the Bidder, prior to the scheduled **Date and Time of the Bid Opening** as stated on **page 1** of the **Invitation To Bid**, and in conformity with requirements of the Awarding Authority and any laws or Departmental regulations of the State of Connecticut or of the United States which may affect the same, for and in consideration of the price(s) stated on this **Bid Proposal Form**, hereof.

1.3.3 The Bidder acknowledges that the **Proposed Lump Sum Base Bid** submitted on this **Bid Proposal Form** includes all work indicated on the drawings and/or described in the specifications, **except** for the **Contingent Work** described in **Subsection 2.4**.

1.3.4 The Bidder acknowledges and agrees to furnish all labor and materials required for this **Project**, in accordance with the accompanying **Plans and Specifications** prepared by the **Architect/Engineer** listed on **page 1** of this Bid Proposal Form, for the **Contract Sum** specified in the **Proposed Lump Sum Base Bid** in **Subsection 2.1** of this Bid Proposal Form, subject to **additions** and **deductions** according to the terms of the specifications, and including the number of **Addenda** stated in **Subsection 2.2** of this Bid Proposal Form.

1.4 Award:

1.4.1 All Bid Proposals shall be subject to the provisions of **Section 00 21 13 Instructions to Bidders** and for purpose of award, consideration shall be given only to Bid Proposals submitted by qualified and responsible Bidders.

1.4.2 The award shall be made on the **lowest Lump Sum Bid** and any or all **Supplemental Bid(s)** as stated in **Subsection 2.4.2** of this **Bid Proposal Form**, taken sequentially, as applicable, provided funds are available.

1.4.3 In the event of any **discrepancy** between the amount written in words and the amount written in numerical figures, the amount written in words shall be controlling.

2.0 Bid Proposal Requirements:

Bidder Information:

Bid Uploaded On:
(Month) (Day) (Year)

Proposal Of:
(Complete Bidder's Legal Company Name As Registered With the CT Secretary of State)

Firm Address: , ,
(Avenue / Street) (Town / City) (State) (Zip Code)

Contact Person:
(Name) (Title)

Contact Information:
(Phone Number) (Fax Number) (Email Address)

Threshold Project: Major Contractor Registration License No.:

All Bidders for Projects that exceed Threshold Limits (see page 1 of this Bid Proposal Form): Insert your Firm's Major Contractor Registration License Number in the space provided above. **NOTE: If this Project does NOT exceed Threshold Limits, insert "Not Applicable" in the blue box above. Delete this note by pressing the spacebar.**

2.1 Proposed Lump Sum Base Bid:

2.1.1 All Bidders: Insert the Proposed Lump Sum Base Bid in the spaces provided below, including **both** numerical figures and "printed words" dollar amount. The Proposed Lump Sum Base Bid shall include all Allowances, all work indicated on the drawings and/or described in the specifications except for Contingent Work.

2.1.2 The Proposed Lump Sum Base Bid shall be shown in **both** numerical figures and "printed words" dollar amount. In the event of any discrepancy the "printed" words dollar amount shall govern.

2.1.3 The Proposed Lump Sum Base Bid is:

\$
(Place Numerical Figures in the Box Above)

Dollars

(Insert "Printed Words" Dollar Amount in the Box Above)

2.2 Number of Addenda:

2.2.1 All Bidders: Insert the Number of Addenda issued by the State of Connecticut in the space provided below.

2.2.2 Failure to acknowledge the correct number of all Addenda in the box below in this Bid Proposal Form shall cause rejection of the bid.

2.2.3 The Bidder acknowledges that their Proposed Lump Sum Base Bid Proposal includes:

Number of Addenda. If none, enter "0".

2.3 Allowances:

See Section 01 20 00 Contract Considerations in Division 01 General Requirements for Allowances for applicability.

| | |
|--------------|---|
| 2.4 | Contingent Work: |
| 2.4.1 | Base Bid Quantities and Defined Unit Prices: See Section 01 20 00 Contract Considerations in Division 01 General Requirements for applicability regarding Base Bid Quantities and Defined Unit Prices for Earth and Rock Excavation, Miscellaneous Items, Alterations Items, Environmental Remediation, and/or Hazardous Building Materials Abatement. |
| 2.4.2 | Supplemental Bids: |
| | .1 See Section 01 23 13 Supplemental Bids in Division 01 General Requirements for applicability . |
| | .2 All Bidders: If Supplemental Bids are applicable to this Project, insert the Supplemental Bids in the spaces provided below. Any Supplemental Bids listed below, <i>if</i> accepted by the Owner, will be taken cumulatively and in numerical order as scheduled. No Supplemental Bid will be skipped or taken out of numerical order as scheduled. |

| | | |
|---|-----------------------------------|---|
| Supplemental Bid No. 1: Enter information in blue boxes below: | | |
| ADD: \$ | <input type="text"/> | <input type="text"/> Dollars |
| | <i>(Insert Numerical Figures)</i> | <i>(Insert "Printed Words" Dollar Amount)</i> |
| Supplemental Bid No. 2: Enter information in blue boxes below: | | |
| ADD: \$ | <input type="text"/> | <input type="text"/> Dollars |
| | <i>(Insert Numerical Figures)</i> | <i>(Insert "Printed Words" Dollar Amount)</i> |
| Supplemental Bid No. 3: Enter information in blue boxes below: | | |
| ADD: \$ | <input type="text"/> | <input type="text"/> Dollars |
| | <i>(Insert Numerical Figures)</i> | <i>(Insert "Printed Words" Dollar Amount)</i> |
| Supplemental Bid No. 4: NOT APPLICABLE | | |
| ADD: \$ | <input type="text"/> | <input type="text"/> Dollars |
| | <i>(Insert Numerical Figures)</i> | <i>(Insert "Printed Words" Dollar Amount)</i> |

| | |
|--------------|--|
| 2.5 | Bidder's Qualification Statement and Objective Criteria for Evaluating Bidders: |
| 2.5.1 | All Bidders: Download Section 00 45 14 General Contractor Bidder's Qualification Statement from CTsource for the template and instructions. Complete and upload Section 00 45 14 General Contractor Bidder's Qualification Statement to CTsource <i>prior</i> to the date and time of the Bid Opening. Information with regards to the General Contractor's Bidder's Qualification Statement is submitted and is made part of this Bid Proposal Form . Failure of a Bidder to answer any question or provide required information shall be grounds for the awarding authority to disqualify and reject the bid, pursuant to Connecticut General Statutes §4b-92. |
| 2.5.2 | All Bidders shall comply with Section 00 45 15 Objective Criteria Established for Evaluating Qualifications of Bidders . Note: Individual Specification Sections may contain General Contractor and/or Subcontractor Qualification requirements that exceed those in Section 00 45 15 Objective Criteria Established for Evaluating Qualifications of Bidders . |

| | |
|--------------|--|
| 2.6 | Prequalification Requirements for Projects Exceeding \$500,000: (see Sections 00 40 15 DAS Contractor Prequalification Certification Requirements and 00 40 16 DAS Update Bid Statement Requirements) |
| 2.6.1 | All Bidders for Projects with estimated Construction Costs greater than \$500,000: Upload to CTsource a current copy of your Firm's " DAS Contractor Prequalification Certificate " and " Update (Bid) Statement " for the applicable Class of Work on page 1 of this Bid Proposal Form <i>prior</i> to the date and time of the Bid Opening. Failure to comply with this requirement shall cause rejection of the bid and shall not be considered a minor irregularity under C.G.S. § 4b-95 . |
| 2.6.2 | Named Subcontractor(s) for Subcontracts exceeding \$500,000: The Named Subcontractor(s) <i>must</i> be " prequalified " by DAS in the Class of Work specified in Table 2.7 of this Bid Proposal Form <i>at the time of bid submission</i> , pursuant to C.G.S. §4b-91(j) and C.G.S. § 4a-100 , as amended, to the extent the Class of Work for the Named Subcontractor is a Prequalification Classification. This requirement also applies to the Bidder, if the Bidder is a Named Subcontractor. Failure to comply with this requirement shall cause rejection of the bid and shall not be considered a minor irregularity under C.G.S. § 4b-95 . |

2.7 Named Subcontractors and Classes of Work:

2.7.1 All Bidders for Projects with one or more Classes of Work checked in Table 2.7 below: Complete Table 2.7 according to the instructions below. Failure to properly provide all of the **required information** in Table 2.7 may cause rejection of the bid.

| Table 2.7: Named Subcontractors and Classes of Work: | |
|--|--|
| <input checked="" type="checkbox"/> | Electrical Work: Enter information in blue boxes below: Complete Subcontractor Name: <input style="width: 80%; height: 15px;" type="text"/> Proposed Dollar Value of Subcontract: \$ <input style="width: 15%; height: 15px;" type="text"/> |
| <input checked="" type="checkbox"/> | HVAC Work: Enter information in blue boxes below: Complete Subcontractor Name: <input style="width: 80%; height: 15px;" type="text"/> Proposed Dollar Value of Subcontract: \$ <input style="width: 15%; height: 15px;" type="text"/> |
| <input checked="" type="checkbox"/> | Masonry Work: Enter information in blue boxes below: Complete Subcontractor Name: <input style="width: 80%; height: 15px;" type="text"/> Proposed Dollar Value of Subcontract: \$ <input style="width: 15%; height: 15px;" type="text"/> |
| <input checked="" type="checkbox"/> | Plumbing Work: Enter information in blue boxes below: Complete Subcontractor Name: <input style="width: 80%; height: 15px;" type="text"/> Proposed Dollar Value of Subcontract: \$ <input style="width: 15%; height: 15px;" type="text"/> |
| <input type="checkbox"/> | Environmental Remediation: NOT APPLICABLE Complete Subcontractor Name: <input style="width: 80%; height: 15px;" type="text"/> Proposed Dollar Value of Subcontract: \$ <input style="width: 15%; height: 15px;" type="text"/> |
| <input type="checkbox"/> | Hazardous Materials Abatement: NOT APPLICABLE Complete Subcontractor Name: <input style="width: 80%; height: 15px;" type="text"/> Proposed Dollar Value of Subcontract: \$ <input style="width: 15%; height: 15px;" type="text"/> |

- 2.7.2 Instructions For Table 2.7:**
- .1 In accordance with C.G.S. 4b-93(b), each Class of Work set forth in a separate section of the specifications pursuant to this Section shall be a **subtrade** designated in Table 2.7 of this Bid Proposal Form and shall be the matter of a **subcontract**.
 - .2 For each Class of Work checked in Table 2.7, the Bidder shall insert the name of each **Subcontractor** with their **Proposed Dollar Value of Subcontract**; this is known as the "**Named Subcontractor**".
 - .3 For each Class of Work checked in Table 2.7, if a Bidder intends to use **one or more Subcontractors** to perform **any portion** of the **Classes of Work**, including circumstances where the Subcontractor is a Small Business Enterprise (SBE) or a Minority Business Enterprise (MBE), then it shall provide **ALL** of the Subcontractor Names and Proposed Dollar Values of each Subcontract. Insert additional Subcontractor Names and Proposed Dollar Values in Table 2.7 (continued) "**ADDITIONAL Named Subcontractors and Classes of Work**" on the following page.
 - .4 If a Bidder customarily performs any of the specified Classes of Work and is Prequalified by DAS for the Class of Work at the time of the Bid Opening Date if the work is greater than \$500,000, the Bidder may list **itself** as a Subcontractor together with its **price** in the space provided in Table 2.7. Failure to properly provide all of the **required information** in Table 2.7 shall cause **rejection** of the bid.
 - .5 If the Bidder does **not** name **itself** or a **Subcontractor** for a specified Class of Work, it shall be presumed that the Bidder intends to perform with its own employees **all work** in such specified classes. The Bidder shall be required to perform with its own employees **all** of the work of the specified class. Subcontracting any portion of such specified class of work subsequently, will be considered a violation of **C.G.S. § 4b-95** and subject the Bidder to disqualification under **C.G.S. § 4b-95(e)**.
 - .6 In the event that the Bidder names a Subcontractor to perform **some, but not all**, of the separate section of the specifications for a particular Class of Work, then it will be presumed, in addition, that the Bidder intends to perform the **balance** of the Class of Work. **Post-bid**, the Bidder **cannot substitute** a Subcontractor for one named in the Bid Proposal Form or bring in a Subcontractor for any designated subtrade work presumed to be performed by the General Contractor's own forces, except for "Good Cause" as determined by the awarding authority.
 - .7 In the event the Bidder either lists itself or is presumed to perform with its own employees all work in a specified class, no such sub-bid by a Bidder shall be considered unless the Bidder can show to the satisfaction of the awarding authority, based on objective criteria established for such purpose, that it customarily performs such subtrade work and is qualified to do the character of work required by the applicable section of the specifications.

**Table 2.7 (continued):
 ADDITIONAL Named Subcontractors and Classes of Work:**

ALL BIDDERS: CLICK HERE, AND THEN CLICK DROPDOWN ARROW to select a Class of Work:

| | | |
|---------------------------------------|----|--|
| Complete Subcontractor Name: | | |
| Proposed Dollar Value of Subcontract: | \$ | |

ALL BIDDERS: CLICK HERE, AND THEN CLICK DROPDOWN ARROW to select a Class of Work:

| | | |
|---------------------------------------|----|--|
| Complete Subcontractor Name: | | |
| Proposed Dollar Value of Subcontract: | \$ | |

ALL BIDDERS: CLICK HERE, AND THEN CLICK DROPDOWN ARROW to select a Class of Work:

| | | |
|---------------------------------------|----|--|
| Complete Subcontractor Name: | | |
| Proposed Dollar Value of Subcontract: | \$ | |

ALL BIDDERS: CLICK HERE, AND THEN CLICK DROPDOWN ARROW to select a Class of Work:

| | | |
|---------------------------------------|----|--|
| Complete Subcontractor Name: | | |
| Proposed Dollar Value of Subcontract: | \$ | |

ALL BIDDERS: CLICK HERE, AND THEN CLICK DROPDOWN ARROW to select a Class of Work:

| | | |
|---------------------------------------|----|--|
| Complete Subcontractor Name: | | |
| Proposed Dollar Value of Subcontract: | \$ | |

ALL BIDDERS: CLICK HERE, AND THEN CLICK DROPDOWN ARROW to select a Class of Work:

| | | |
|---------------------------------------|----|--|
| Complete Subcontractor Name: | | |
| Proposed Dollar Value of Subcontract: | \$ | |

ALL BIDDERS: CLICK HERE, AND THEN CLICK DROPDOWN ARROW to select a Class of Work:

| | | |
|---------------------------------------|----|--|
| Complete Subcontractor Name: | | |
| Proposed Dollar Value of Subcontract: | \$ | |

ALL BIDDERS: CLICK HERE, AND THEN CLICK DROPDOWN ARROW to select a Class of Work:

| | | |
|---------------------------------------|----|--|
| Complete Subcontractor Name: | | |
| Proposed Dollar Value of Subcontract: | \$ | |

ALL BIDDERS: CLICK HERE, AND THEN CLICK DROPDOWN ARROW to select a Class of Work:

| | | |
|---------------------------------------|----|--|
| Complete Subcontractor Name: | | |
| Proposed Dollar Value of Subcontract: | \$ | |

ALL BIDDERS: CLICK HERE, AND THEN CLICK DROPDOWN ARROW to select a Class of Work:

| | | |
|---------------------------------------|----|--|
| Complete Subcontractor Name: | | |
| Proposed Dollar Value of Subcontract: | \$ | |

ALL BIDDERS: CLICK HERE, AND THEN CLICK DROPDOWN ARROW to select a Class of Work:

| | | |
|---------------------------------------|----|--|
| Complete Subcontractor Name: | | |
| Proposed Dollar Value of Subcontract: | \$ | |

ALL BIDDERS: CLICK HERE, AND THEN CLICK DROPDOWN ARROW to select a Class of Work:

| | | |
|---------------------------------------|----|--|
| Complete Subcontractor Name: | | |
| Proposed Dollar Value of Subcontract: | \$ | |

ALL BIDDERS: CLICK HERE, AND THEN CLICK DROPDOWN ARROW to select a Class of Work:

| | | |
|---------------------------------------|----|--|
| Complete Subcontractor Name: | | |
| Proposed Dollar Value of Subcontract: | \$ | |

| | |
|--------------|--|
| 2.8 | Set Aside Requirements: (see Sections 00 62 39 DAS-Set Aside Certificate Requirements, 00 73 38 "CHRO Contract Compliance Regulations", and 00 73 40 CHRO Bidder Contract Compliance Monitoring Report Requirements) |
| 2.8.1 | For Projects Less Than \$500,000: Submit a current copy of your Firm's "DAS Set-Aside Certificate" <i>with</i> your Bid Proposal Form <i>prior</i> to the date and time of the Bid Opening. |
| 2.8.2 | For Projects Less Than \$500,000: Upload a completed copy of the CHRO Employment Information Form, "Bidder Contract Compliance Monitoring Report" <i>with</i> your Bid Proposal Form <i>prior</i> to the date and time of the Bid Opening. The report is on the CHRO Webpage (http://www.ct.gov/chro/cwp/view.asp?a=2525&Q=315900&chroPNavCtr=#45679). |
| 2.8.3 | All Bidders shall be required to award not less than the percentage(s) stated on page 1 of this Bid Proposal Form to Subcontractors who are currently certified and eligible to participate under the State of Connecticut Set-Aside Program for SBE and/or MBE contractors, in accordance with C.G.S. § 4a-60g. Failure to meet these requirements shall cause rejection of the bid. |

| | |
|--------------|--|
| 2.9 | Insurance Coverages: The limits of liability for the Insurance required for this project shall be those listed in Article 35 Contractors Insurance of Section 00 73 13 General Conditions . Also see Section 00 62 16 Certificate of Insurance. |
| 2.9.1 | Commercial General Liability Insurance: The Bidder shall maintain Commercial General Liability (CGL) Insurance. NOTE: All selected firms are required to provide an endorsement to the CGL insurance stating that the State of Connecticut, the Department of Administrative Services, and their respective officers, agents, and employees shall be named as an Additional Insured. Please be advised that a blanket endorsement may not be acceptable. Products/Completed Operations insurance shall be maintained for the duration of the Project and shall be maintained for a minimum of three (3) years after certification by the Owner that all Work has been completed and accepted by the Owner in accordance with the Contract Documents. CGL coverage may include Special Hazards Insurance , as described below. |
| 2.9.2 | Special Hazards Insurance: <input type="checkbox"/> None is Required. <input checked="" type="checkbox"/> The Bidder shall maintain Special Hazards Insurance, including coverage for explosion, collapse or underground damage (X-C-U) . <input type="checkbox"/> The Bidder shall maintain Special Hazards Insurance, including coverage for Asbestos Abatement and Lead Liability . |
| 2.9.3 | Owner's and Contractor's Protective Liability Insurance: The Bidder shall maintain Owner's and Contractor's Protective Liability Insurance. This coverage shall be for and in the name of the State of Connecticut. |
| 2.9.4 | Automobile Liability Insurance: The Bidder shall maintain Automobile Liability Insurance for the operation of all motor vehicles including those owned, non-owned and hired or used in connection with the Contract. Should the Bidder not own any automobiles, the automobile & liability requirement shall be amended to allow the Bidder to maintain only hired and non-owned liability coverage. |
| 2.9.5 | Umbrella Liability Insurance: The Bidder shall maintain Umbrella Liability Insurance. The Bidder shall provide an endorsement to the Umbrella Liability Insurance stating that the State of Connecticut is an Additional Insured. |
| 2.9.6 | Workers Compensation/Employer Liability Insurance: The Bidder shall maintain Workers Compensation/Employer Liability Insurance. |
| 2.9.7 | Builder's Risk Insurance: <input type="checkbox"/> None is Required. <input checked="" type="checkbox"/> The Bidder shall maintain Builder's Risk Insurance providing coverage for the entire Work at the project site, portions of the Work located away from the site but intended for use at the site, and portions of the Work in transit. Coverage shall be written on an All-Risk, Replacement Cost, and completed Value Form basis in an amount at least equal to the projected completed value of the Work. Prior to the Owner's issuance of a Notice to Proceed, the Contractor shall provide coverage for the entire Work in an amount equal to the total contract amount and any additional modifications. The Owner and its officers, agents and employees shall be listed as Loss Payee subject to the prior review of the Owner, and not as an Additional Insured for these coverages. The Builder's Risk Insurance policy shall state it is for the benefit of and payable to the State of Connecticut. The Period of Coverage shall be the number of Calendar Days from Construction Start Date to Substantial Completion as stated in the Bid Proposal Form of the Project Manual, plus ninety (90) Calendar Days to Acceptance of the Work. |
| 2.9.8 | Inland Marine/Transit Insurance (Transportation Insurance): <input type="checkbox"/> None is Required. <input checked="" type="checkbox"/> The Bidder shall maintain Inland Marine/Transit Insurance (Transportation Insurance) provided the coverage is not afforded by a Builder's Risk policy. The Inland Marine/Transit Insurance policy shall endorse the State of Connecticut as a Loss Payee and the policy shall state it is for the benefit of and payable to the State of Connecticut. |

3.0 Bid Proposal Acknowledgements:

The Bidder *acknowledges and agrees* to the following:

3.1 To Upload to CTsource the Bid Proposal Form (all pages) and all other Bid Documents, Affidavits, and Certifications prior to the Date and Time of the Bid Opening:

3.1.1 The Bidder acknowledges and agrees to electronically upload to **CTsource** all pages of the **Bid Proposal Form**, and all other **Bid Documents, Affidavits, and Certifications** as directed in **Section 00 11 16 Invitation to Bid, Section 00 21 13 Instructions to Bidders, and Section 00 41 10 Bid Package Submittal Requirements**.

3.1.2 The State may waive minor irregularities which it considers in the best interest of the State and, when applicable, are corrected by the Bidder within seven (7) Calendar Days after the Bid Due Date. Failure to properly complete, sign and upload any of the items marked with an asterisk (*) in **Table 1 of Section 00 41 10 Bid Package Submittal Requirements** *shall* cause rejection of the bid and *shall not* be considered a minor irregularity under **C.G.S. § 4b-95**.

3.1.3 If there are any delays in the receipt of other documents, then the Bid shall remain valid for the same additional number of days. For example, if the documents are submitted four (4) Calendar Days later; then the bid shall remain valid for ninety-four (94) Calendar Days.

3.1.4 Failure to submit the documents before the stated deadline **may** result in rejection of the bid at the sole discretion of the Commissioner of Administrative Services.

3.2 To Hold Bid Price:

The Bidder acknowledges and agrees to hold the **Proposed Lump Sum Base Bid** in **Subsection 2.1** of this Bid Proposal Form for **ninety (90) Calendar Days** and any extensions caused by the Bidder's delays in required submissions. The Bidder and the State may mutually agree to extend this period. The agreement to extend the **ninety (90) Calendar Day** period may occur after the expiration of the original **ninety (90) Calendar Day** period.

3.3 To Use and Accept Allowances:

When applicable to this Project, the Bidder **acknowledges and agrees** to accept and use the **Allowances** as shown in **Section 01 20 00 Contract Considerations** of Division 01 General Requirements as part of the **Proposed Lump Sum Base Bid** listed in **Subsection 2.1** of this Bid Proposal Form.

3.4 To Use and Accept the Following Contingent Work:

3.4.1 **Unit Prices:** When applicable to this Project, the Bidder **acknowledges and agrees** to accept and use the **Units, Add Unit Prices, and Deduct Unit Prices** as shown in **Section 01 20 00 Contract Considerations** of Division 01 General Requirements in evaluating either additions to or deductions from the Work.

3.4.2 **Supplemental Bid:** When applicable to this Project and if accepted by the Owner, the Bidder **acknowledges and agrees** to provide all labor, material and equipment to complete the Work in accordance with the **Supplemental Bid** described in **Section 01 23 13 Supplemental Bids** of Division 01 General Requirements and provided by the **Bidder** in **Subsection 2.4.2** of this Bid Proposal Form.

3.5 To Use the Named Subcontractors Listed in Table 2.7:

3.5.1 The Bidder **agrees** that each of the **Named Subcontractors** stated in **Table 2.7** of this Bid Proposal Form will be used for the **Class of Work** indicated, for the **Proposed Total Subcontract Value dollar amount stated, unless** a **substitution** is permitted by the awarding authority as provided for in and in accordance with C.G.S. § 4b-96, as amended.

3.5.2 **For Named Subcontractor(s) with Subcontracts exceeding \$500,000**, the Bidder acknowledges that the **Named Subcontractor(s)** *must* be "prequalified" by DAS in the **Class of Work** specified in **Table 2.7** of this **Bid Proposal Form** *at the time of bid submission*, pursuant to **C.G.S. §4b-91(j)** and **C.G.S. § 4a-100**, as amended, to the extent the Class of Work for the Named Subcontractor is a Prequalification Classification. In addition, the Bidder agrees to submit within *ten (10) Calendar Days* after receipt of the "Set-Aside Contractor Schedule Request" the current DAS Prequalification Certificate(s) and Update (Bid) Statement(s) for each Named Subcontractor in **Table 2.7** of this Bid Proposal Form.

3.6 To Make Good Faith Efforts to Employ MBEs:

The Bidder acknowledges and agrees to make **good faith efforts** to employ **Minority Business Enterprises (MBEs)** as **Subcontractors** and **Suppliers** of materials under such Contract.

3.0 Bid Proposal Acknowledgements (continued):

3.7 To Submit a Certified Check or Bid Bond (if required):

The Bidder acknowledges and agrees to submit a **Certified Check** or **Standard Bid Bond** *prior* to the due date and time of the Bid Opening (if required). Download **Section 00 43 16 Standard Bid Bond** from **CTsource** for the template and instructions.

3.8 To Accept the Current Prevailing Wage Rate Schedule:

The U. S. Secretary of Labor's latest decision and the State of Connecticut Department of Labor (DOL) Prevailing Wage Rate Schedule are all incorporated in the documents. The higher rate (Federal or State) for any given occupation shall prevail. At the time of bidding, the Bidder agrees to accept the current Prevailing Wage Rate Schedule, as well as the annual adjustment to the prevailing wage rate that is in effect each July 1st, as provided by DOL. See **Section 00 73 44 Prevailing Wage Rates/Contractor's Wage Certification/Payroll Certification**. Annual adjustments of prevailing wage rates will *not* be considered a matter for a contract amendment with DAS/CS.

3.9 To Comply With CHRO Requirements:

If applicable, the Apparent Low Bidder acknowledges and agrees to provide the Commission on Human Rights and Opportunities with such information as is requested by the Commission concerning their **employment practices and procedures** as they relate to the current provisions of the Connecticut General Statutes governing Contract requirements within **fifteen (15) calendar days after** receipt of the "Request for the *Affirmative Action Plan and Employment Information Form Letter*" from the DAS/CS Office of Legal Affairs, Policy, and Procurement.

3.10 To Ensure Executive Order No. 11246 for Equal Employment Opportunity & Non-Segregated Facilities Has Been Met:

The Apparent Low Bidder acknowledges and agrees to ensure that Executive Order No. 11246 for Equal Employment Opportunity & Non-Segregated Facilities has been met for their firm and their Subcontractors. The Apparent Low Bidder also agrees to certify (if required) to the compliance of non-segregated facilities.

3.11 To Obtain and Maintain Required Insurance Coverages:

The Bidder acknowledges and agrees to obtain and maintain the required Insurance Coverages and submit the Firm's "**Certificate of Liability Insurance Acord® form**" within **ten (10) business days after** receipt of the "Letter of Intent" from the DAS/CS Office of Legal Affairs, Policy, and Procurement, as discussed in **Section 00 62 16 Certificate of Insurance** and **Article 35, "Contractors Insurance"** in **Section 00 73 13 General Conditions**.

3.12 To Comply With Security Requirements for CT Department of Correction (DOC) Facilities:

When applicable to this Project, the Bidder acknowledges and agrees to comply with **Section 00 73 63 CT DOC Security Requirements** for Contract Forces on DOC Facilities.

3.13 To Ensure C.G.S. § 12-430 for Non-Resident Contractors Has Been Met:

If applicable, the Apparent Low Bidder acknowledges and agrees to provide either a copy of the "**Notice of Verified Status**" (Verification Letter) from the Connecticut Department of Revenue Services (DRS) (for **Verified Nonresident** General/Prime Contractors) or a copy of **Form AU-965 "Acceptance of Surety Bond"** from DRS (for **Unverified Nonresident** General/Prime Contractors) within **ten (10) business days after** receipt of the "Letter of Intent" from the DAS/CS Office of Legal Affairs, Policy, and Procurement which evidences that **C.G.S. § 12-430** for non-resident contractors has been met, as described in **Section 00 92 30 Procedures Regarding Taxation for Nonresident General/Prime Contractor and Subcontractors**.

3.14 To Execute Contract:

If selected as the Prime Contractor, the Bidder acknowledges and agrees to **execute a Contract** in accordance with the terms of this **Bid Proposal Form** and the **Contract** within **ten (10) Calendar Days** (legal State holidays excluded) *after* notification thereof by the awarding authority. See **Section 00 52 03 Contract** for a sample.

3.15 NEW: To Ensure C.G.S. § 49-41a for Payments to Subcontractors Has Been Met:

For all State contracts that require a **Labor and Material Bond** in accordance with **C.G.S. §49-41**:

3.15.1 If selected as the Prime Contractor, the Bidder acknowledges and agrees to pay any amounts due each Subcontractor, whether for labor performed or materials furnished, within **thirty (30) days** after payment to the Contractor by the State, when the labor or materials have been included in a requisition submitted by the Contractor and paid by the State.

3.15.2 If selected as the Prime Contractor, the Bidder acknowledges and agrees to include in each of its Subcontracts a provision requiring each Subcontractor to pay any amounts due any of its Subcontractors, whether for labor performed or materials furnished, within **thirty (30) days** after such Subcontractor receives a payment from the Contractor which encompasses labor or materials furnished by such Subcontractor.

4.0 Confidentiality of Documents:

- 4.1** The **undersigned** agrees that if not selected as the Prime Contractor for this project, all plans and specifications in their possession for the project shall be destroyed.
- 4.2** The **undersigned** agrees that if selected as the Prime Contractor for this project:
- 4.2.1** The **plans and specifications** shall not be disseminated to anyone except for construction of this project.
- 4.2.2** The **following provision** shall be included in all of its contracts with subcontractors and sub-consultants:
- “Any and all drawings, specifications, maps, reports, records or other documents associated with the contract shall only be utilized to the extent necessary for the performance of the work and duties under this contract. Said drawings, specifications, maps, reports, records and other documents may not be released to any other entity or person except for the sole purpose of the work described in this contract. No other disclosure shall be permitted without the prior written consent of DAS Construction Services. When any such drawings, specifications, maps, reports, records or other documents are no longer needed, they shall be destroyed.”*
- 4.2.3** Upon completion of the construction and the issuance of a certificate of occupancy, the plans and specifications shall be returned to DAS Construction Services, or destroyed, or retained in a secure location and not released to anyone without first obtaining the permission of DAS Construction Services.

5.0 Bid Proposal Declarations:

I (we), the undersigned, hereby declare that I am (we are) the only person(s) interested in the Bid Proposal and that it is made without any connection with any other person making any Bid Proposal for the same work. No person acting for, or employed by, the State of Connecticut is directly or indirectly interested in this Bid Proposal, or in any Contract which may be made under it, or in expected profits to arise therefrom. This Bid Proposal is made without directly or indirectly influencing or attempting to influence any other person or corporation to bid or refrain from bidding or to influence the amount of the Bid Proposal of any other person or corporation. This Bid Proposal is made in good faith without collusion or connection with any other person bidding for the same work and this proposal is made with distinct reference and relation to the plans and specifications prepared for this Contract. I (we) further declare that in regard to the conditions affecting the Work to be done and the labor and materials needed, this Bid Proposal is based solely on my (our) own investigation and research and not in reliance upon any representations of any employee, officer or agent of the State.

6.0 Duly Authorized Signature:

Type of Business: *(Check Applicable Box)*

| | |
|--|---|
| <input type="checkbox"/> Limited Liability Corporation (LLC) <input type="checkbox"/> Partnership <input type="checkbox"/> Sole Proprietor <input type="checkbox"/> Doing Business As (d/b/a) <i>(If d/b/a box is checked provide complete name below)</i> <input style="width: 100%;" type="text"/> <i>(Doing Business As Name)</i> | <input type="checkbox"/> Corporation <i>(If Checked, Provide Corporate Seal Below)</i> <div style="border: 1px solid black; width: 100px; height: 100px; margin: 0 auto;"></div> <i>(Provide <u>exact</u> corporate name from corporate seal below)</i> <input style="width: 100%;" type="text"/> <i>(Name On Corporate Seal)</i> |
|--|---|

| | | | |
|----------------------------|---|--|---|
| Signed: | <input style="width: 90%;" type="text"/> <i>(Month)</i> | <input style="width: 90%;" type="text"/> <i>(Day)</i> | <input style="width: 90%;" type="text"/> <i>(Year)</i> |
| Bidder's Signature: | <input style="width: 100%;" type="text"/> <i>(Duly Authorized)</i> | | <input style="width: 100%;" type="text"/> <i>(Title)</i> |
| | <input style="width: 100%;" type="text"/> <i>(Print Named)</i> | | <input style="width: 100%;" type="text"/> <i>(Date)</i> |

Bid Package Submittal Requirements:

**DAS ● Construction Services ● Office of Legal Affairs, Policy, and Procurement
 450 Columbus Boulevard, Suite 1302 ● Hartford, CT 06103**

| | |
|------------|--|
| 1.1 | All Bidders: |
| | All Bidders are required to electronically upload their Bid Proposal Form, Bid Package Documents, Affidavits, and Certifications to CTsource <i>prior</i> to the date and time of the Bid Opening. |
| 1.1.1 | See Table 1 for a list of documents that All Bidders <u>must</u> electronically upload to CTsource prior to the date and time of the Bid Opening. |
| 1.1.2 | Minor Irregularities: The State may waive minor irregularities that otherwise may cause rejection of a Bid only when waiving such minor irregularities is in the best interests of the State and the minor irregularities have been corrected by the Bidder within seven (7) Calendar Days after the Bid Due Date. |
| 1.1.3 | Rejection of the Bid: Failure to properly complete, sign and upload to CTsource any of the items marked with an asterisk (*) in Table 1 prior to the date and time of the Bid Opening shall cause rejection of the bid and shall not be considered a minor irregularity under Connecticut General Statutes (C.G.S.) § 4b-95 . |

| | | | |
|------------|--|----|---|
| 1.2 | Three Apparent Lowest Bidders and the Apparent Low Bidder: | | |
| | The Three Apparent Lowest Bidders and the Apparent Low Bidder must submit Supportive Documents as directed in Tables 2 and 3 , respectively, <i>prior</i> to the stated deadlines. | | |
| 1.2.1 | See Table 2 for a list of Supportive Documents for the Three Apparent Lowest Bidders. | | |
| 1.2.2 | See Table 3 for a list of Supportive Documents for the Apparent Low Bidder. | | |
| 1.2.3 | Delays in Receipt: If there are any delays in the receipt of the Supportive Documents specified in Tables 2 and 3, then the Bids shall remain valid for the same additional number of days. <table border="0" style="margin-left: 20px;"> <tr> <td style="width: 20px;">.1</td> <td>For example, since the Three Apparent Lowest Bidders are required to Hold The Bid Price for ninety (90) calendar days, if Supportive Documents are submitted four (4) calendar days later, then the bid shall remain valid for ninety-four (94) calendar days.</td> </tr> </table> | .1 | For example, since the Three Apparent Lowest Bidders are required to Hold The Bid Price for ninety (90) calendar days , if Supportive Documents are submitted four (4) calendar days later , then the bid shall remain valid for ninety-four (94) calendar days . |
| .1 | For example, since the Three Apparent Lowest Bidders are required to Hold The Bid Price for ninety (90) calendar days , if Supportive Documents are submitted four (4) calendar days later , then the bid shall remain valid for ninety-four (94) calendar days . | | |
| 1.2.4 | Failure to submit the Supportive Documents before the stated deadlines may result in rejection of the bid at the sole discretion of the Commissioner of Administrative Services. | | |

| TABLE 1 - ALL BIDDERS | | | |
|-----------------------|------------------------|--|---------------|
| Construction Costs: | | The Bid Proposal Form, Other Bid Package Documents, Affidavits, and Certifications <u>shall</u> be electronically uploaded to CTsource by <u>all</u> Bidders prior to the Date and Time of the Bid Opening. | Form Location |
| Less Than \$500,000 | Greater Than \$500,000 | | |

| Bid Proposal Form and Other Bid Package Documents | | | |
|---|-------------------------------------|--|--------------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | * Section 00 41 00 Bid Proposal Form | CTsource |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | * Section 00 43 16 Standard Bid Bond or Certified Check | CTsource |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | * Section 00 45 14 General Contractor Bidder's Qualification Statement | CTsource |
| | <input checked="" type="checkbox"/> | * DAS Prequalification Certificate | DAS Website |
| | <input checked="" type="checkbox"/> | * DAS Update (Bid) Statement | DAS Website |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Section 00 40 14 Certificate (of Authority) | CTsource |
| <input checked="" type="checkbox"/> | | DAS Set-Aside Certificate | DAS Website |
| <input checked="" type="checkbox"/> | | Bidder Contract Compliance Monitoring Report | CHRO Website |

| Affidavits and Certifications | | | |
|-------------------------------------|-------------------------------------|--|--------------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | * Gift and Campaign Contribution Certification – OPM Ethics Form 1 | OPM Website |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | * Consulting Agreement Affidavit – OPM Ethics Form 5 | OPM Website |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | * Ethics Affidavit (Regarding State Ethics) – OPM Ethics Form 6 | OPM Website |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | * Iran Certification – OPM Ethics Form 7 | OPM Website |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Nondiscrimination Certification – Form A, B, C, D, or E | OPM Website |

*** NOTE:** The State may waive minor irregularities that otherwise may cause rejection of a Bid only when waiving such minor irregularities is in the best interests of the State and the minor irregularities have been corrected by the Bidder within seven (7) Calendar Days after the Bid Due Date. Failure to properly complete, sign and upload to **CTsource** any of the items marked with an **asterisk (*)** in **Table 1** prior to the date and time of the Bid Opening **shall** cause rejection of the bid and shall **not** be considered a minor irregularity under C.G.S. § 4b-95.

| TABLE 2 THREE (3) APPARENT LOWEST BIDDERS | | | |
|--|-------------------------------------|--|------------------------------------|
| Construction Costs: | | WHEN APPLICABLE: | Form Location |
| Less Than \$500,000 | Greater Than \$500,000 | Submit the following Supportive Documents to the DAS/CS Procurement Unit within ten (10) Calendar Days after receipt of the “Set-Aside Contractor Schedule Request” from the DAS/CS Procurement Unit: | |
| | <input checked="" type="checkbox"/> | Set-Aside Contractor Schedule for each subcontracted SBE and/or MBE firm(s) (See Section 00 73 27 Set-Aside Contractor Schedule for a sample Request.) | Email From DAS/CS Procurement Unit |
| | <input checked="" type="checkbox"/> | DAS Set-Aside Certificate(s) for each subcontracted SBE and/or MBE firm(s) listed in the Set-Aside Contractor Schedule. | DAS Website |
| | <input checked="" type="checkbox"/> | Section 00 45 17 Named Subcontractor Bidder’s Qualification Statements for each Named Subcontractor listed in the Bid Proposal Form. | Copy from Project Manual |
| | <input checked="" type="checkbox"/> | DAS Prequalification Certificate(s) and Update (Bid) Statement(s) for each Named Subcontractor listed in the Bid Proposal Form with Subcontracts greater than \$500,000. | DAS Website |

| TABLE 3 APPARENT LOW BIDDER | | | |
|-------------------------------------|-------------------------------------|--|--------------------------------|
| Construction Costs: | | WHEN APPLICABLE: | Form Location |
| Less Than \$500,000 | Greater Than \$500,000 | Submit the following Supportive Documents as directed below within fifteen (15) calendar days after receipt of the “Request for the Affirmative Action Plan and Employment Information Form Letter” from the DAS/CS Procurement Unit: | |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Submit to CHRO if Contractor has 50 or more employees and/or the Project is equal to or greater than \$500,000: Affirmative Action Plan and Employment Information for State of Connecticut. | CHRO Website & CTsource |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Submit to DAS/CS Procurement Unit: Copy of CHRO Transmittal Letter to confirm the Affirmative Action Plan was filed with CHRO. | (copy of transmittal letter) |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Submit to Connecticut Department of Labor: Contractors Wage Certification Form. See Section 00 73 44 Prevailing Wage Rates/Contractor’s Wage Certification/Payroll Certification. | Copy from Project Manual |

| TABLE 3 APPARENT LOW BIDDER (continued) | | | |
|--|-------------------------------------|---|---|
| Construction Costs: | | Submit to DAS/CS Procurement Unit the following Supportive Documents within ten (10) business days after receipt of the "Letter of Intent" from the DAS/CS Procurement Unit: | Form Location |
| Less Than \$500,000 | Greater Than \$500,000 | | |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Section 00 40 14 Certificate (of Authority) | Email From DAS/CS Procurement Unit |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Section 00 52 03 Contract | Email From DAS/CS Procurement Unit |
| | <input checked="" type="checkbox"/> | Section 00 52 73 Subcontract Agreement Form (Named & Listed) | Email From DAS/CS Procurement Unit |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Certificate of Liability Insurance Acord® form (See Section 00 62 16 Insurance Certificate Form for details) | Email From DAS/CS Procurement Unit |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Certificate of Asbestos Abatement Liability Insurance (for asbestos abatement only; see Section 00 62 16.1 Asbestos Abatement Liability Insurance for details) | Email From DAS/CS Procurement Unit |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Section 00 92 10: Additional Forms | Performance Bond |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | Labor & Material Bond |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | Surety Sheet |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | Bidder's Certification: Financial Position & Corporate Structure |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Power of Attorney from the Surety Company | Surety Company |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Nonresident (Out of State) Contractors: Verified Nonresident General/Prime Contractors must submit a copy of their "Notice of Verified Status" (Verification Letter) from the CT Department of Revenue Services (DRS). Unverified Nonresident General/Prime Contractors must submit a copy of Form AU-965 "Acceptance of Surety Bond" from the DRS. (See Section 00 92 30 Procedures Regarding Taxation for Nonresident General/Prime Contractor and Subcontractors for additional details.) | CT Department of Revenue Services |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities: For projects disturbing one or more total acres of land area , submit a copy of the signed Stormwater Pollution Control Plan "Contractor Certification Statement" and License Transfer Form , as directed by the DAS/CS Architect/Engineer, prior to commencement of any construction activities. | DAS/CS Architect/Engineer |
| | <input checked="" type="checkbox"/> | Ethics Affidavit (Regarding State Ethics) OPM Ethics Form 6 for each Named Subcontractor | OPM Website |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Threshold Projects Only: Submit Major Contractor Registration License Number(s) for Subcontractors | CT Department of Consumer Protection |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | SEEC Form 10 | SEEC Website |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Certificate of Legal Existence from Corporations | Secretary of the State |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | UPDATED: Contractor and Subcontractor Payments Reporting: Every Contractor (and its Subcontractors) shall log on to PMWeb each month and enter payments they have received from the state, from the Contractor, or from a higher tier Subcontractor (as applicable). | PMWeb |

End of Section
 00 41 10 Bid Package Submittal Requirements

INSTRUCTIONS FOR CERTIFIED CHECK OR BID BOND (select one):

All Bidders:

**Check the appropriate box below and edit the Bid Bond if applicable.
Print, sign, and scan to PDF. Upload the PDF form to CTsource.**

- CERTIFIED CHECK OPTION:** *Prior* to the Date and Time of the Bid Opening:
 - (1) Check the box for "Certified Check Option";
 - (2) Print, scan to PDF, and upload the PDF form to **CTsource**; and
 - (3) Deliver the Certified Check, made payable to "Treasurer, State of Connecticut", to the following address:
 - State of Connecticut
 - Department of Administrative Services, Construction Services
 - Office of Legal Affairs, Policy, and Procurement
 - 450 Columbus Boulevard, North Tower, Suite 1302
 - Hartford, CT 06103-1835
- BID BOND OPTION** (see template below): *Prior* to the Date and Time of the Bid Opening:
 - (1) Check the box for "Bid Bond Option";
 - (2) Complete the **Standard Bid Bond** (below), print, sign, scan to PDF, and upload the PDF Bid Bond to **CTsource**.

Standard Bid Bond

DAS • Construction Services • Office of Legal Affairs, Policy, and Procurement

KNOW ALL MEN BY THESE PRESENTS, That we, _____
_____, hereinafter called the Principal,
of _____, as Principal,
and _____, hereinafter
called the Surety, a corporation organized and existing under the laws of the
State of _____, and duly authorized to transact a
surety business in the State of Connecticut, as Surety, are held and firmly bound unto the State of
Connecticut, as Obligee, in the penal sum of ten (10) percent of the amount of the bid set forth in a
proposal hereinafter mentioned, _____

_____,
lawful money of the United States of America, for the payment of which, well and truly to be made to the Obligee,
the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns,
jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, That, whereas the Principal has submitted _____
or is about to submit a proposal to the Obligee related to a contract for Project No.: _____

NOW, THEREFORE, if the said contract be awarded to the Principal and the Principal shall, within such time as
may be specified, enter into the said contract in writing with the State of Connecticut and give the required
bonds, with surety acceptable to the Obligee, or if the Principal shall fail to do so, pay to the Obligee the
damages which the Obligee may suffer by reason of such failure not exceeding the penalty of this bond, then
this obligation shall be void, otherwise to remain in full force and effect.

SIGNED, SEALED AND DELIVERED this _____ day of _____, 20 _____

(Principal's Signature) _____ Surety

(Print Name) by _____
_____ Its attorney in fact Signature
_____ Company Name _____ (Print Name)

General Contractor Bidder's Qualification Statement

DAS • Construction Services • Office of Legal Affairs, Policy, and Procurement

Instructions:

- All Bidders are **required to upload this form to CTsource**, properly completed, **prior to the date and time of the Bid Opening**.
- Failure of a Bidder to answer any question or provide required information **shall** be grounds for the awarding authority to disqualify and reject the bid, pursuant to Connecticut General Statutes §4b-92.
- If a question or request for information does not pertain to your organization in any way, use the symbol "NA" (Not Applicable).
- Attach additional information on 8 ½" x 11" sheets with your letterhead as necessary and reference specific section and subsection numbers.
- **NOTE:** The Department reserves the right to request any additional or supplemental information necessary to complete its evaluation of a Bidder's qualification.

1.0 Project Information:

1.1 DAS/CS Project Number:

1.2 Project Name:

1.3 Project Location:

2.0 Projects with Construction Costs Estimated To Be Greater than \$500,000:

- Select the applicable **Class of Work** as stated in the **00 11 16 Invitation to Bid**.
- Select **YES** if your Firm has the applicable the **DAS Prequalification Certificate and Update (Bid) Statement** or **NO** if it does not.
- If **YES**, upload the applicable **DAS Prequalification Certificate and Update (Bid) Statement** to **CTsource** **prior** to the date and time of the Bid Opening.

Not Applicable - Construction Costs Less than \$500,000

Class of Work:

Does your Firm have the applicable
 DAS Prequalification Certificate and
 Update (Bid) Statement?

2.1 General Building Construction (Group A):

YES NO

2.2 General Building Construction (Group B):

YES NO

2.3 General Building Construction (Group C):

YES NO

2.4 General Trades (Interior Work Only):

YES NO

3.0 Firm's Present Legal Name: (the *complete legal name exactly* as it appears with the **Secretary of State registry**. The appropriate **title** must be used throughout the documents, for example: General Partner, Member, Manager, Sole Member, etc.)

Name:

4.0 How many years has your Firm been in business under its **Present Legal Name**?

Years:

5.0 How many years has your Firm been in business as a General Contractor?

Years:

6.0 Indicate **all** other **names** by which your Firm has been known and the **length of time** known by each name:

6.1

| | |
|--|--|
| | |
|--|--|

Years Months

6.2

| | |
|--|--|
| | |
|--|--|

Years Months

6.3

| | |
|--|--|
| | |
|--|--|

Years Months

7.0 This Firm's **Certification** with the CT Secretary of State:

Check Box

Type of Business Entity:

Certification Year

Corporation

Partnership

Sole Proprietorship

Limited Liability Company (LLC)

Other:

| |
|--|
| |
| |
| |
| |
| |

8.0 Attach resumes of all **supervisory personnel**, such as **Principals, Project Managers, and Superintendents**, who will be directly involved with the project on which you are now a bidder. Indicate their construction related training, certifications and licenses and the number of years of actual construction experience. Indicate the number of years of this actual construction experience which were in a Supervisory capacity.

9.0 Named Subcontractor – Bidder Intends to Self-Perform:

Check **YES** or **NO** for each “Named Subcontractor” **Class of Work** which your firm intends to perform with its own employees for this Contract; see **Section 2.7** of **Section 00 41 00 Bid Proposal Form**.

NOTE: For Projects with Construction Costs estimated to be greater than \$500,000, complete **Section 00 45 17 Named Subcontractor Bidder's Qualification Statement** for each **Named Subcontractor Class of Work** checked **YES** and submit within ten (10) calendar days **after** receipt of the “Set-Aside Contractor Schedule Request” from DAS/CS Office of Legal Affairs, Policy, and Procurement.

Not Applicable – No Named Subcontractors &/or Not Self-Performing

| | Named Subcontractor Class of Work | Does your Firm intend to self-perform this Named Subcontractor Class of Work? | |
|-----|-----------------------------------|---|-----------------------------|
| 9.1 | Electrical: | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| 9.2 | HVAC: | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| 9.3 | Masonry: | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| 9.4 | Plumbing: | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| 9.5 | Environmental Remediation: | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| 9.6 | Hazardous Materials Abatement: | YES <input type="checkbox"/> | NO <input type="checkbox"/> |

10.0 Named Subcontractor - Class of Work Greater than \$500,000 and Self-Performing:

- Select the applicable **Named Subcontractor Class of Work** which your firm intends to perform with its own employees for this Contract.
- Select **YES** if your Firm has the applicable the **DAS Prequalification Certificate and Update (Bid) Statement** or **NO** if it does not.
- If **YES**, submit the applicable **DAS Prequalification Certificate and Update (Bid) Statement** within ten (10) calendar days **after** receipt of the “Set-Aside Contractor Schedule Request” from DAS/CS Office of Legal Affairs, Policy, and Procurement.

Not Applicable – No Class of Work Greater \$500,000 &/or Not Self-Performing

| | Named Subcontractor Class of Work Greater Than \$500,000 | Does your Firm have the applicable DAS Prequalification Certificate and Update (Bid) Statement? | |
|------|--|---|-----------------------------|
| 10.1 | <input type="checkbox"/> Electrical: | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| 10.2 | <input type="checkbox"/> HVAC: | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| 10.3 | <input type="checkbox"/> Masonry: | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| 10.4 | <input type="checkbox"/> Plumbing: | YES <input type="checkbox"/> | NO <input type="checkbox"/> |

11.0 List all construction projects your Firm has completed in the **past five (5) years**. Provide **all** of the information listed below. DAS/CS *may* reject a bid as **non-responsive** if the bidder does not make **all** required pre-award submittals within the designated time period. Attach additional sheets as necessary **using the following format**:

IMPORTANT NOTE: **Two (2)** of the construction projects completed in the past five (5) years shall be (1) single project contracts that have reached substantial completion, not aggregate projects; (2) of commercial and/or institutional construction work (this includes compliance with general requirements); (3) within the Cost Estimate Range stated in Section 00 11 16 Invitation to Bid for this project; and (4) of the size and complexity of this Project. Failure to identify to **two** such projects **shall** result in rejection of the bid.

| | | |
|---|---------------|-----------------------|
| 11.1 Project Title: | | |
| 11.2 Project Location: | | |
| 11.3 Construction Start Date: | | |
| 11.4 Construction Finish Date: | | |
| 11.5 Describe the Scope of Work your Firm performed: | | |
| 11.6 Original Contract Amount: | | |
| 11.7 Final Contract Amount: | | |
| 11.8 Original Contract Duration (Calendar Days): | | |
| 11.9 Final Contract Duration (Calendar Days): | | |
| 11.10 Owner: | | |
| 11.11 Owner's Representative: | | |
| | <i>(Name)</i> | <i>(Phone Number)</i> |
| 11.12 Design Firm: | | |
| 11.13 Design Firm's Representative: | | |
| | <i>(Name)</i> | <i>(Phone Number)</i> |

12.0 References:

Furnish references from **architects, engineers or owners** indicating that your Firm has satisfactorily completed in a timely manner contract work for projects within the cost estimate range, size and complexity of this project. Provide explanations where delays have occurred. This information should cover work done over the past five years.

13.0 Construction Scheduler:

For Projects greater than \$5 Million: Submit the **name, resume and references** of the **Construction Scheduler** in accordance with the requirements called for in Section **01 32 16.13 Critical Path Method Schedules** of the General Requirements.

Not Applicable – Project Less Than \$5 Million

14.0 List and explain if your Firm has ever failed to complete a contract or if any officer or partner of your Firm has ever been an officer or partner of another organization that failed to complete a contract. Indicate below the circumstances leading to the project failure and the name of the company which provided the bonding for the failed contract(s):

Not Applicable

15.0 List and explain if your Firm has ever had a contract terminated, indicating the circumstances leading to the project termination of contract(s):

Not Applicable

16.0 List and explain all legal or administrative proceedings against your Firm or any officers, principals, partners, members, or employees of the organization currently pending or concluded adversely within the last five years, and any judicial or administrative sanctions that are still in effect against such organization, and any of its officers, principals, partners, members, or employees. (Exclude Occupational Safety and Health Act [OSHA] violations which are called for elsewhere in this statement). Add attachments as necessary.

Not Applicable

17.0 List and explain any disbarments or suspensions that have been imposed on your Firm in the past five years or that were still in effect during the five year period or that are still in effect. Such list must include disbarments and suspensions of officers, principals, partners, members, and employees of your Firm:

Not Applicable

18.0 List and explain any other reason(s) that precludes your Firm or any officer, principal, partner, member, or employees thereof from bidding on a contract in Connecticut or any other jurisdiction:

Not Applicable

19.0 List and explain all willful or serious violations your Firm has had of any OSHA or of any standard, order or regulation promulgated pursuant to such act, during the three year period preceding the bid, provided such violations were cited in accordance with the provisions of any State Occupational Safety and Health Act or Occupational Safety and Health Act of 1970. Indicate whether these were abated within the time fixed by the citation or whether the citation was appealed. If appealed what is the status or disposition. Add attachments as necessary.

Not Applicable

20.0 List and explain any criminal convictions your Firm has had related to the injury or death of any employee in the three-year period preceding the bid: Add attachments as necessary.

Not Applicable

21.0 List and explain any changes in your Firm's financial condition or business organization, which might affect your Firm's ability to successfully complete this contract:

Not Applicable

22.0 List and explain if your Firm has ever failed to submit an Affirmative Action Plan to the Commission on Human Rights and Opportunities (CHRO). Indicate below the circumstances leading to the failure to submit the Affirmative Action Plan to CHRO:

Not Applicable

23.0 List and explain if your Firm's Affirmative Action Plan has ever been disapproved by CHRO or determined to be noncompliant. Indicate below the circumstances leading to the disapproval or finding of noncompliance of your Affirmative Action Plan by CHRO:

Not Applicable

24.0 **NEW:** Anti-Discrimination and Anti-Harassment Requirements: List all claims of alleged harassment or discriminatory conduct asserted, filed or claimed against your firm, and to the best of the Firm's knowledge and belief, against its proposed subcontractors and suppliers being utilized for this Project. For each such claim, describe in sufficient detail the nature of the claim and its disposition. This includes claims against the Firm's officers, directors, shareholders, partners and employees.

Not Applicable

24.1 If any claim resulted in a finding or admission of discriminatory conduct on the part of an officer, director, shareholder, partner or employee, list the actions taken by your Firm or the applicable subcontractor and/or supplier to address and mitigate the individual's conduct, including actions that made it clear such conduct: (i) is not tolerated and will not occur in the future; (ii) will not negatively impact the performance of work on the project job site; and (iii) does not reflect the beliefs and culture of the contractor, subcontractor, or supplier. DAS will expect that your Firm, subcontractor, and/or supplier implement systematic monitoring and evaluation of the workplace to exclude such conduct.

25.0 **NEW:** Confirm that your Firm's employment statistics have been submitted in the online "Employment Information Form", located within your Firm's **CTsource** account. Follow the instructions in **6001 Construction Online Bidding Instructions**, available for download from the online DAS/CS Library (<http://portal.ct.gov/DASCSLibrary>) > 6000 Series:

Employment Information Form Completed

26. Signature

Dated at

Signed this

 day of , 20

Name of Firm:

Firm Address:

Signature:

Print or Type Name:

Title:

27. Notary Statement

Mr./Mrs./Ms. being duly sworn

deposes and says that he/she is the of

(Position or Title)

, and that the answers to the foregoing

(Firm Name)

questions and all statements therein contained are true and correct.

Subscribed and sworn before me this day of , 20

Notary Public

My Commission Expires , 20

End of Section

00 45 14 General Contractor Bidder's Qualification Statement

Objective Criteria Established for Evaluating Qualifications of Bidders:

CT DAS ● Construction Services ● Office of Legal Affairs, Policy, and Procurement

The following items are established pursuant to Sections 4b-92, 4b-94 and 4b-95a of the Connecticut General Statutes (C.G.S.) as amended. **NOTE:** Please see the **new** objective criteria in **Sections 1.22 and 1.23**.

The **Objective Criteria Established for Evaluating Qualifications of Bidders** (this Section 00 45 15) are to assure that the State of Connecticut will secure the "lowest responsible and qualified bidder" who has the ability, capacity, **and integrity** to successfully complete the Bid Proposal Form and the Work. Failure to comply with any portion of this requirement **may** cause **rejection** of the bid. **NOTE:** Individual Specification Sections **may** contain General Contractor and/or Subcontractor Qualification requirements that **exceed** those in this Section 00 45 15 Objective Criteria Established for Evaluating Qualifications of Bidders.

NEW: Anti-Discrimination and Anti-Harassment Requirements:

In accordance with DAS Policy, DAS strictly prohibits discrimination, including sexual harassment and harassment based on all of the following legally protected classes: race; color; religious creed; age; sex; pregnancy; sexual orientation; gender identity or expression; marital status; national origin; ancestry; intellectual disability; physical disability (including, but not limited to, blindness); mental disability; or, veteran status. This prohibition applies to all DAS-administered construction projects, and entities and individuals performing work on such projects. All contractors, subcontractors, and suppliers, as well as their officers, directors, shareholders, partners, employees, or other individuals associated with such entities, are expected to participate in these efforts to ensure that no discriminatory or harassing conduct occurs in connection with a DAS project. This is part of the meaning of a responsible contractor as a contractor with the integrity to ensure faithful performance of the work in a non-discriminatory manner.

DAS will consider instances, of which we become aware, of **alleged** discriminatory behavior on the part of a Bidder, subcontractors or suppliers. This will include the conduct of such entities' officers, directors, shareholders, partners, and employees. Such discriminatory conduct can include instances of name-calling, racist jokes or comments, bullying, intimidation and harassment on the basis of the person being a member of the protected class. Instances of **proven** discriminatory conduct on the part of an entity or individual **may** result in DAS not awarding a contract to a contractor, or require the substitution of a subcontractor or supplier.

In situations involving discriminatory conduct on the part of an officer, director, shareholder, partner or employee, DAS will also consider, as part of the responsibility review, the actions taken by the contractor, subcontractor and supplier to address and mitigate the individual's conduct. DAS will expect that the contractor, subcontractor, or supplier implement systematic monitoring and evaluation of the workplace to exclude such conduct. Regardless of where the discriminatory conduct occurs, if the contractor, subcontractor or supplier fails to address it, the contractor, subcontractor or supplier **shall not be** considered responsible or having the integrity necessary for the faithful performance of the work.

THE BIDDER MUST HAVE OR HAVE COMPLETED THE FOLLOWING:

1.1 DAS Prequalification Requirements:

For Projects with Construction Costs greater than \$500,000, **all Bidders** shall upload to **CTsource** a valid Department of Administrative Services (DAS) **Prequalification Certificate** and **Update (Bid) Statement** **prior** to the date and time of the Bid Opening.

| | |
|------------|--|
| 1.2 | Evaluation: |
| 1.2.1 | All Bidders shall upload to CTsource Section 00 45 14 General Contractor's Bidder Qualifications Statement <i>prior</i> to the date and time of the Bid Opening. |
| 1.2.2 | If applicable, the Three (3) Lowest Bidders shall submit Section 00 45 17 Named Subcontractor's Bidder Qualification Statement(s) to DAS Construction Services (DAS/CS) Office of Legal Affairs, Policy, and Procurement within ten (10) calendar days <i>after</i> receipt of the "Set-Aside Contractor Schedule Request" <i>from</i> DAS/CS. |
| 1.2.3 | The Bidder must demonstrate that the Bidder and, if applicable, its Named Subcontractors, meet the objective criteria for this specific project. |
| 1.2.4 | The responses to the Statement(s) must identify two (2) projects completed – single project contracts that have reached substantial completion, not aggregate projects – of commercial and/or institutional construction work (this includes compliance with general requirements) during the past five (5) years within the Cost Estimate Range stated in Section 00 11 16 Invitation to Bid for this project, and of the size and complexity of this project. The failure to identify to such projects shall result in rejection of the bid. |
| 1.2.5 | If the Bidder identifies two projects that meet the above criteria, the State's evaluation shall be based on the performance record of the prospective Bidder as a general, prime contractor and its named subcontractors during the course of the two (2) comparable projects, and not just the end result. The state will conduct the evaluation based on its interpretation of its objective criteria. Evaluation criteria shall include: Faithful and efficient performance; fulfillment of contract obligations; financial, managerial and technical abilities; and integrity and the absence of any conflicts of interest. Any one or all of the factors noted in this paragraph as well as in the other criteria set forth in this Section 00 45 15 may be grounds for the determination by the State, in its sole discretion, of the Bidder's responsibility and qualifications necessary for the faithful performance of the work required of this project. |
| 1.3 | References: |
| | Furnished references from architects, engineers or owners indicating that it has satisfactorily completed in a timely manner contract work for projects and provide explanations where delays have occurred. This information should cover work done over the past five years . Review of DAS/CS projects shall be included in the evaluation of the bidder's qualifications and anticipated future performance. |
| 1.4 | Qualified Personnel: |
| 1.4.1 | Shown that it customarily employs or has on its payroll supervisory personnel, qualified to perform the work required for this project and to coordinate the work called for in the Bid Specifications. |
| 1.4.2 | If the project is for \$5 Million or more, submit the name, resume and references of the Construction Scheduler in accordance with the requirements called for in Section 01 32 16.13 Critical Path Method Schedules of the General Requirements. |
| 1.5 | Past Performance: |
| | Demonstrated a good track record of past performance on State or other projects relative to quantity, quality, timeliness, cost, cooperation and harmonious working relationships with subcontractors, suppliers and client agencies. DAS/CS will review the Bidders past performance ratings prepared by DAS/CS or prepared as part of the DAS Contractor Prequalification Program. This review may focus on the comments relative to: Quality of Supervision, Adherence to Contract Documents, On Time Project Completion, Subcontractor performance, and the handling of Change Orders. Unacceptable ratings for several criteria shall be sufficient cause to deem a bidder not responsible. |
| 1.6 | Financial Responsibility: |
| | Shown that it is financially responsible to perform the work as bid. If requested, additional financial information shall be provided. Prompt and proper payments to its subcontractors and material suppliers is a critical factor to be considered by DAS/CS. |
| 1.7 | [Left Blank] |

| | |
|-------------|---|
| 1.8 | Equipment Requirements: |
| | Shown that it owns or possesses, rented, or leased equipment of the type customarily required by contractors in the performance of contract work and that such equipment, if needed, is available for this project. |
| 1.9 | Materials and Suppliers: |
| | Purchased materials over the past three years from suppliers who customarily sell such materials in quantity to contractors. |
| 1.10 | Physical Facilities: |
| | Control of adequate physical facilities from which the work can be performed. |
| 1.11 | Compliance with Subcontractor Requirements: |
| | Demonstrated that on previous state projects the bidder complied in good faith with the requirements of listing subcontractors as outlined in C.G.S. Sections 4b-93 and 4b-95. |
| 1.12 | Threshold Building and Major Contractor Requirements: |
| | Demonstrated that all major subcontractors are in compliance with the provisions of C.G.S. Section 20-341gg, as revised, concerning licensure requirements to perform work on any structure that exceeds the threshold limits contained in C.G.S. Section 29-276b, as revised. |
| 1.13 | OSHA Requirements: |
| | Proven that the Bidder has not been found to be in violation of three or more willful or serious violations of Occupational Safety and Health Administration (OSHA) regulations in the past three years. |
| 1.14 | Criminal Convictions and Injuries or Death of Employees: |
| | Not received a criminal conviction related to the injury or death of any employee in the three-year period preceding the bid. |
| 1.15 | Legal or Administrative Proceedings: |
| | Listed all legal (court and/or arbitration) or administrative proceedings currently pending as well as any legal (court and/or arbitration) or administrative proceeding related to procurement or performance of any public or private construction contracts which has concluded adversely within the last three years. |
| 1.16 | Contract Performance and Surety: |
| | Identified any situations where: (1) the bidder failed to complete a construction contract; or (2) bonds were called during the past three years. If applicable, attach a sheet providing explanation including date(s) and location(s). |
| 1.17 | State Tax Requirements: |
| | Not been found to be in violation of any state tax requirements of the Connecticut Department of Revenue Services in the five (5)-year period preceding the bid. |
| 1.18 | State and Federal Labor Requirements: |
| | Not been found to be in violation of any State or Federal labor laws as required through the Department of Labor including violations of prevailing wage laws in the five (5)-year period preceding the bid. |
| 1.19 | Change Order Pricing and State Ethics: |
| | Been found to be in compliance with all statutory and regulatory requirements. This Item shall include, but not be limited to, any DAS/CS determinations related to improper Change Order pricing relative to C.G.S. Section 1-101nn of The State Ethics Statutes. |

1.20 Internal Revenue Services (IRS) Requirements:

Not been found in violation of any of the **Internal Revenue Service Tax Requirements** regarding classification of employees and independent contractors in the five (5)-year period preceding the bid.

1.21 Workers Compensation and Insurance Requirements:

Not been found to be in any violation of C.G.S. Section 31-288 relating to employee classification for purposes of Workers' Compensation insurance premiums in the five (5)-year period preceding the bid.

1.22 NEW: Anti-Discrimination and Anti-Harassment Requirements:

Listed all claims of alleged harassment, including sexual harassment, and discriminatory conduct against a member of a legally protected class, asserted, filed or claimed against the Bidder, and to the best of the Bidder's knowledge and belief, against its proposed subcontractors and suppliers being utilized for this Project. For each such claim, described in sufficient detail the nature of the claim and its disposition. This includes claims against the Bidder's officers, directors, shareholders, partners and employees.

1.22.1 If any claim resulted in a finding or admission of discriminatory conduct on the part of an officer, director, shareholder, partner or employee:

Listed the actions taken by the Bidder or the applicable subcontractor and/or supplier to address and mitigate the individual's conduct, including actions that made it clear such conduct: (i) is not tolerated and will not occur in the future; (ii) will not negatively impact the performance of work on the project job site; and (iii) does not reflect the beliefs and culture of the Bidder, subcontractor, or supplier. DAS will expect that the Bidder, subcontractor, and/or supplier implement systematic monitoring and evaluation of the workplace to exclude such conduct.

**1.23 UPDATED: CHRO Contract Compliance Requirements
(Regulations of Connecticut State Agencies Section 46a-68j-30(10)):**

1.23.1 Developed and implemented a successful affirmative action plan.

1.23.2 Developed an apprenticeship program complying with Sections 46a-68-1 to 46a-68-17 of the Administrative Regulations of Connecticut State Agencies, inclusive.

1.23.3 Submitted employment statistics contained in the "**Employment Information Form**" located within the Firm's **CTsource** account, indicating that the composition of its workforce is at or near parity when compared to the racial and sexual composition of the workforce in the relevant labor market area. Follow the instructions in **6001 Construction Online Bidding Instructions**, available for download from the online DAS/CS Library (<http://portal.ct.gov/DASCSLibrary>) > 6000 Series.

1.23.4 Set aside a portion of the contract for legitimate minority business enterprises. See Section 46a-68j-30(10)(E) of the Contract Compliance Regulations.

NOTE: The foregoing Item Numbers **1.13** and **1.14** are meant to comport with C.G.S. Section 31-57b.

**End of Section
00 45 15 Objective Criteria Established for Evaluating Qualifications of Bidders**

Named Subcontractor Bidder's Qualification Statement

DAS ● Construction Services ● Office of Legal Affairs, Policy, and Procurement

Instructions:

- This Section is **only applicable** to Projects with Construction Costs **Greater than \$500,000.00**. See **Subsection 2.7 Named Subcontractors and Classes of Work** of **00 41 00 Bid Proposal Form** for applicability.
- If a question or request for information does not pertain to your organization in any way, use the symbol "NA" (Not Applicable). Attach additional information on 8 ½" x 11" sheets with your letterhead as necessary and reference specific subsection number.
- Submit this form for **each** of the Named Subcontractors, within **ten (10)** calendar days **after** receipt of the "Set-Aside Contractor Schedule Request" to:

State of Connecticut
Department of Administrative Services, Construction Services
Office of Legal Affairs, Policy, and Procurement
450 Columbus Boulevard, Suite 1302
Hartford, CT 06103

1.0 Project Information:

1.1 DAS/CS Project Number:

1.2 Project Name:

1.3 Project Location:

2.0 Named Subcontractor Class of Work:

Check the applicable Class of Work:

2.1 Electrical Work:

2.2 HVAC Work:

2.3 Masonry Work:

2.4 Plumbing Work:

2.5 Environmental Remediation:

2.6 Hazardous Materials Abatement:

3.0 Subcontractor's Present Legal Name:

Name:

4.0 How many years has the **Subcontractor** been in business under its **Present Legal Name**?

Years:

5.0 How many years has the **Subcontractor** been in business as a Subcontractor for this Class of Work?

Years:

6.0 If the **Subcontractor** has not always been a Subcontractor for this Class of Work then list the trade(s) that your firm customarily performed prior to the time that you became a Subcontractor in this **Class of Work**:

6.1

6.2

6.3

7.0 Indicate **all other names** by which this **Subcontractor** has been known and the **length of time** known by each name:

| | | | |
|------------|--|---|---|
| 7.1 | <input style="width: 95%; height: 40px;" type="text"/> | <input style="width: 40px; height: 25px;" type="text"/> | <input style="width: 40px; height: 25px;" type="text"/> |
| | | <i>Years</i> | <i>Months</i> |
| 7.2 | <input style="width: 95%; height: 40px;" type="text"/> | <input style="width: 40px; height: 25px;" type="text"/> | <input style="width: 40px; height: 25px;" type="text"/> |
| | | <i>Years</i> | <i>Months</i> |
| 7.3 | <input style="width: 95%; height: 40px;" type="text"/> | <input style="width: 40px; height: 25px;" type="text"/> | <input style="width: 40px; height: 25px;" type="text"/> |
| | | <i>Years</i> | <i>Months</i> |

8.0 The-Subcontractor's Certification with the CT Secretary of State:

| Check Box | Type of Business Entity: | Certification Year |
|--------------------------|---|---|
| <input type="checkbox"/> | Corporation | <input style="width: 100%; height: 25px;" type="text"/> |
| <input type="checkbox"/> | Partnership | <input style="width: 100%; height: 25px;" type="text"/> |
| <input type="checkbox"/> | Sole Proprietorship | <input style="width: 100%; height: 25px;" type="text"/> |
| <input type="checkbox"/> | Limited Liability Company (LLC) | <input style="width: 100%; height: 25px;" type="text"/> |
| <input type="checkbox"/> | Other: <input style="width: 350px; height: 25px;" type="text"/> | <input style="width: 100%; height: 25px;" type="text"/> |

9.0 Attach resumes of all supervisory personnel, such as Principals, Project Managers, and Superintendents, who will be directly involved with this project on which you are now a **Named Subcontractor** Bidder for a specific **Class of Work**. Indicate the number of years of construction experience and number of years of which they were in a Supervisory capacity.

10.0 List all sub-trades which your firm customarily performs with own employees – **this table must be completed for electrical and plumbing trades for all projects.**

| | Trade Name | License Holder Name | Connecticut D.C.P. License No.: Format: Prefix - Number - Suffix |
|------|------------|---------------------|--|
| 10.1 | | | |
| 10.2 | | | |
| 10.3 | | | |
| 10.4 | | | |
| 10.5 | | | |

11.0 Trade References:
 Names, addresses and telephone numbers of several firms with whom your organization has regular business dealings (attach separate sheets as necessary).

12.0 List all construction projects your firm currently has under contract. Provide all of the information listed below. DAS/CS *may* reject a bid as **non-responsive** if the bidder does not make **all** required pre-award submittals within the designated time period. Attach additional sheets as necessary **using the following format:**

| | | | |
|--------------|---|---------------|-----------------------|
| 12.1 | Project Title: | | |
| 12.2 | Project Location: | | |
| 12.3 | Construction Start Date: | | |
| 12.4 | Construction Finish Date: | | |
| 12.5 | Describe the Scope of Work your Firm performed: | | |
| 12.6 | Original Contract Amount: | | |
| 12.7 | Final Contract Amount: | | |
| 12.8 | Original Contract Duration (Calendar Days): | | |
| 12.9 | Final Contract Duration (Calendar Days): | | |
| 12.10 | *Briefly describe any complaints about your Firm's quality control or construction management. | | |
| | *Attach a separate sheet if more space is required. | | |
| 12.11 | Owner: | | |
| 12.12 | Owner's Representative: | | |
| | | <i>(Name)</i> | <i>(Phone Number)</i> |
| 12.13 | Design Firm: | | |
| 12.14 | Design Firm's Representative: | | |
| | | <i>(Name)</i> | <i>(Phone Number)</i> |
| 12.15 | General Contractor: | | |
| 12.16 | G.C.'s Representative: | | |
| | | <i>(Name)</i> | <i>(Phone Number)</i> |

13.0 List all construction projects your firm has completed in the **past five (5) years or list the ten (10) projects** your firm has most recently completed. Provide **all** of the information listed below. DAS/CS *may* reject a bid as **non-responsive** if the bidder does not make **all** required pre-award submittals within the designated time period. Attach additional sheets as necessary **using the following format:**

| | | |
|---|--|-----------------------|
| 13.1 Project Title: | | |
| 13.2 Project Location: | | |
| 13.3 Construction Start Date: | | |
| 13.4 Construction Finish Date: | | |
| 13.5 Describe the Scope of Work your Firm performed: | | |
| 13.6 Original Contract Amount: | | |
| 13.7 Final Contract Amount: | | |
| 13.8 Original Contract Duration (Calendar Days): | | |
| 13.9 Final Contract Duration (Calendar Days): | | |
| 13.10 *Briefly describe any complaints about your Firm's quality control or construction management. | | |
| | <i>*Attach a separate sheet if more space is required.</i> | |
| 13.11 Owner: | | |
| 13.12 Owner's Representative: | | |
| | <i>(Name)</i> | <i>(Phone Number)</i> |
| 13.13 Design Firm: | | |
| 13.14 Design Firm's Representative: | | |
| | <i>(Name)</i> | <i>(Phone Number)</i> |
| 13.15 General Contractor: | | |
| 13.16 G.C.'s Representative: | | |
| | <i>(Name)</i> | <i>(Phone Number)</i> |

14.0 Has your Firm ever failed to complete a contract or has any officer or partner of your Firm ever been an officer or partner of another organization that failed to complete a contract? If so, indicate below the circumstances leading to the project failure and the name of the company which provided the bonding for the failed contract(s):

Not Applicable

15.0 List all legal or administrative proceedings currently pending or concluded adversely within the last five years which relate to procurement or performance of any public or private construction contracts. (Exclude Occupational Safety and Health Act [OSHA] violations which are called for elsewhere in this statement). Add attachment as necessary.

Not Applicable

16.0 List all willful or serious violations of any OSHA or of any standard, order or regulation promulgated pursuant to such act, during the three year period preceding the bid, provided such violations were cited in accordance with the provisions of any State Occupational Safety and Health Act or Occupational Safety and Health Act of 1970. Indicate whether these were abated within the time fixed by the citation or whether the citation was appealed. If appealed what is the status or disposition. Add attachments as necessary.

Not Applicable

17.0 Has your Firm had any criminal convictions related to the injury or death of any employee in the three-year period preceding the bid? Please list any such convictions below. Add attachments as necessary.

Not Applicable

18.0 **NEW:** Anti-Discrimination and Anti-Harassment Requirements: List all claims of alleged harassment or discriminatory conduct asserted, filed or claimed against your firm, and to the best of the Firm's knowledge and belief, against its proposed subcontractors and suppliers being utilized for this Project. For each such claim, describe in sufficient detail the nature of the claim and its disposition. This includes claims against the Firm's officers, directors, shareholders, partners and employees.

Not Applicable

18.1 If any claim resulted in a finding or admission of discriminatory conduct on the part of an officer, director, shareholder, partner or employee, list the actions taken by your Firm or the applicable subcontractor and/or supplier to address and mitigate the individual's conduct, including actions that made it clear such conduct: (i) is not tolerated and will not occur in the future; (ii) will not negatively impact the performance of work on the project job site; and (iii) does not reflect the beliefs and culture of the contractor, subcontractor, or supplier. DAS will expect that your Firm, subcontractor, and/or supplier implement systematic monitoring and evaluation of the workplace to exclude such conduct.

19.0 **NEW:** Confirm that your Firm's employment statistics have been submitted in the online "**Employment Information Form**", located within your Firm's **CTsource** account. Follow the instructions in **6001 Construction Online Bidding Instructions**, available for download from the online DAS/CS Library (<http://portal.ct.gov/DASCSLibrary>) > 6000 Series:

Employment Information Form Completed

20. Signature

Dated at

Signed this day of , 20

Name of Firm:

Firm Address:

(Signature)

(Print or Type Name)

(Title)

21. Notary Statement

Mr./Mrs./Ms. being duly sworn
deposes and says that he/she is the of
(Position or Title)

, and that the answers to the foregoing
(Firm Name)
questions and all statements therein contained are true and correct.

Subscribed and sworn before me this day of , 20

Notary Public

My Commission Expires , 20

End of Section
00 45 17 Named Subcontractor Bidder's Qualification Statement

Contract

DAS ● Construction Services ● Office of Legal Affairs, Policy, and Procurement

Contract For:

Dated as of by and between the **State of Connecticut** (herein called the
(Month, Day, Year)

“State”) acting herein by its Commissioner, Department of Administrative Services under the provisions of the Connecticut General Statutes (C.G.S.) Sections 4-8, 4a-1, 4a-2, 4b-1, 4b-3, and 4b-91, as revised, and (herein called the “Contractor”).

(Print Name of Contractor)

The State and the Contractor in consideration of the hereinafter contained mutual promises and covenants, do hereby agree as follows:

1. CONTRACT AND CONTRACT DOCUMENTS:

The **Invitation for Bids**, the enumerated **Plans**, the **Specifications** and **Amendments** thereto, the **Addenda**, the **Bid Proposal** as accepted by the Commissioner, Department of Administrative Services, **Order of Award**, which Order is made a part of this **Contract**, the **General Conditions**, the **Supplementary Conditions**, the **General Requirements**, the **Contract** and the **Bonds** shall form part of this **Contract** and the **provisions** thereof shall be as binding upon the parties as if they were fully set forth herein. The tables of contents, titles, headings, running headlines and marginal notes contained herein and in said Documents, are solely to facilitate to various provisions of the Contract Documents and in no way affect, limit, or cast light upon the interpretations of the provisions to which they refer. Whenever the term “**Contract Documents**” is used, it shall mean and include this **Contract**, the **Invitation for Bids**, the enumerated **Plans**, **Specifications** and **Amendments** thereto, the **Addenda**, the **Bid Proposal** as accepted by the Commissioner, Department of Administrative Services, the **General Conditions**, the **General Requirements**, the **Bonds**, the **Instructions to Bidders**, the **Wage Scales**, the **Supplementary Conditions**, and the **Insurance Certificates**.

2. SCOPE OF THE WORK:

The Contractor shall furnish all plant, labor, materials, supplies, equipment, and other facilities and things necessary or proper for or incidental to the work contemplated by this Contract as required by and in strict accordance with applicable Plans, Specifications and Amendments thereto, and Addenda (hereinafter enumerated), and as required by and in strict accordance with such changes as are ordered and approved pursuant to this Contract, and will perform all other obligations imposed on him by this Contract.

3. ENUMERATION OF PLANS, SPECIFICATIONS AND ADDENDA:

The following is an enumeration of the Plans, Specifications, and Addenda:

| | |
|----------------------------------|--|
| Prepared By: | <input type="text"/> <i>(Print Name of Architect/Engineer Firm)</i> |
| Plans and Specifications: | <input type="text"/> |
| Addenda: | <input type="text"/> |

4. COMPENSATION TO BE PAID THE CONTRACTOR

The State will pay and the Contractor will accept in full consideration for the performance of the Contractor's obligation hereunder the sum of:

| | | | |
|----------------------|------------------------|----------------------|---|
| <input type="text"/> | Dollars and 00/100 (\$ | <input type="text"/> |) |
|----------------------|------------------------|----------------------|---|

5. PROVISIONS REQUIRED BY LAW DEEMED INSERTED

Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party, the Contract shall forthwith be physically amended to make such insertion.

For all State contracts as defined in the **C.G.S. §9-612(f)(1)(C)**, having a value in a calendar year of \$50,000 or more or a combination or series of such agreements or contracts having a value of \$100,000 or more, the authorized signatory to this Agreement expressly acknowledges receipt of the State Elections Enforcement Commission's notice advising state contractors of campaign contribution and solicitation prohibitions, and will inform its principals of the contents of the notice. See **SEEC Form 10**.

Contractor hereby irrevocably assigns to the State of Connecticut all rights, title and interest in and to all **Claims* associated with this Contract** that Contractor now has or may or will have and that arise under the antitrust laws of the United States, **15 USC Section 1, et seq.** and the antitrust laws of the State of Connecticut, **C.G.S. §35-24, et seq.**, including but not limited to any and all Claims for overcharges. This assignment shall become valid and effective immediately upon the accrual of a Claim without any further action or acknowledgment by the parties.

***Definition of Claims associated with this Contract:** "All actions, suits, claims, demands, investigations and proceedings of any kind, open, pending or threatened, whether mature, unmaturing, contingent, known or unknown, at law or in equity, in any forum."

The Commissioner, Department of Administrative Services for and on behalf of the State of Connecticut, and the Contractor have executed this contract on the day and year first written.

| | |
|---|---|
| State Of Connecticut: By: <input type="text"/> <i>(Signature)</i> Print Name: Noel Petra Its: Deputy Commissioner Department of Administrative Services Date Signed: <input type="text"/> Office of the Attorney General: Approved as to form: By: <input type="text"/> <i>(Signature)</i> Print Name: <input type="text"/> Its: Attorney General / Assistant Deputy Attorney General / Associate Attorney General / Assistant Attorney General Date Signed: <input type="text"/> | Contractor: Firm Name: <input type="text"/> By: <input type="text"/> <i>(Signature)</i> Print Name: <input type="text"/> Its: <input type="text"/> , Duly Authorized Date Signed: <input type="text"/> <input type="text"/> SEAL |
|---|---|

End of Section
00 52 03 Contract

Subcontract Agreement Form

DAS ● Construction Services ● Office of Legal Affairs, Policy, and Procurement

In accordance with the requirements of the Connecticut General Statutes (C.G.S.) §4b-96, the Contractor selected for the Contract shall provide to each of its listed or substitute Named Subcontractors the relevant subcontract, along with a notice setting forth the time limit for execution of such subcontract. The Contractor selected for the Contract shall file with the State of Connecticut Department of Administrative Services (DAS) Construction Services Office of Legal Affairs, Policy, and Procurement an executed copy of each subcontract within ten (10) days (Saturdays, Sundays and legal holidays excluded) of presentation of the subcontract to each subcontractor. Each subcontract shall include at least the provisions set forth in the **Subcontract** form found in C.G.S. §4b-96 and shall follow the order of this **Subcontract Agreement Form**.

C.G.S. §4b-96. Subcontract, form. Procedure on failure of subcontractor to execute subcontract. General bidder's responsibilities.

Within five days after being notified of the award of a general contract by the awarding authority, or, in the case of an approval of a substitute subcontractor by the awarding authority, within five days after being notified of such approval, the general bidder shall present to each listed or substitute subcontractor (1) a subcontract in the form set forth in this section and (2) a notice of the time limit under this section for executing a subcontract. If a listed subcontractor fails within five days, Saturdays, Sundays and legal holidays excluded, after presentation of a subcontract by the general bidder selected as a general contractor, to perform his agreement to execute a subcontract in the form hereinafter set forth with such general bidder, contingent upon the execution of the general contract, the general contractor shall select another subcontractor, with the approval of the awarding authority. When seeking approval for a substitute subcontractor, the general bidder shall provide the awarding authority with all documents showing (A) the general bidder's proper presentation of a subcontract to the listed subcontractor and (B) communications to or from such subcontractor after such presentation. The awarding authority shall adjust the contract price to reflect the difference between the amount of the price of the new subcontractor and the amount of the price of the listed subcontractor if the new subcontractor's price is lower and may adjust such contract price if the new subcontractor's price is higher. The general bidder shall, with respect to each listed subcontractor or approved substitute subcontractor, file with the awarding authority a copy of each executed subcontract within ten days, Saturdays, Sundays and legal holidays excluded, of presentation of a subcontract to such subcontractor. The subcontract shall be in the following form:

(See page 2 and page 3)

SUBCONTRACT

THIS AGREEMENT made this day of , 20, by and between a corporation organized and existing under the laws of (a partnership consisting of) (an individual doing business as) hereinafter called the "Contractor" located at (insert complete address) _____, and a corporation organized and existing under the laws of (a partnership consisting of) (an individual doing business as) hereinafter called the "Subcontractor", located at (insert complete address) _____.

WITNESSETH that the Contractor and the Subcontractor for the considerations hereafter named, agree as follows:

1. The Subcontractor agrees to furnish all labor and materials required for the completion of all work specified in Section No. of the specifications for (Name of Subtrade) and the plans referred to therein and addenda No. , and for the (Complete title of project and the project number taken from the title page of the specifications) all as prepared by (Name of Architect or Engineer) for the sum of (\$) and the Contractor agrees to pay the Subcontractor said sum for said work. This price includes the following alternates:

Supplemental No. (s) , , , , , .

(a) The Subcontractor agrees to be bound to the Contractor by the terms of the hereinbefore described plans, specifications (including all general conditions stated therein which apply to his trade) and addenda No. , , , and , and , and to assume to the Contractor all the obligations and responsibilities that the Contractor by those documents assumes to the (Awarding Authority) , hereinafter called the "Awarding Authority", except to the extent that provisions contained therein are by their terms or by law applicable only to the Contractor.

(b) The Contractor agrees to be bound to the Subcontractor by the terms of the hereinbefore described documents and to assume to the Subcontractor all the obligations and responsibilities that the Awarding Authority by the terms of the hereinbefore described documents assumes to the Contractor, except to the extent that provisions contained therein are by their terms or by law applicable only to the Awarding Authority.

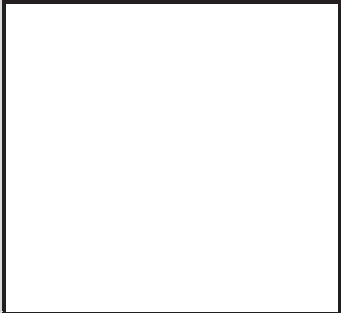

2. The Contractor agrees to begin, prosecute and complete the entire work specified by the Awarding Authority in an orderly manner so that the Subcontractor will be able to begin, prosecute and complete the work described in this subcontract; and, in consideration thereof, upon notice from the Contractor, either oral or in writing, the Subcontractor agrees to begin, prosecute and complete the work described in this Subcontract in an orderly manner in accordance with completion schedules prescribed by the general contractor for each subcontract work item, based on consideration to the date or time specified by the Awarding Authority for the completion of the entire work.

3. The Subcontractor agrees to furnish to the Contractor, within a reasonable time after the execution of this subcontract, evidence of workers' compensation insurance as required by law and evidence of public liability and property damage insurance of the type and in limits required to be furnished to the Awarding Authority by the Contractor.

4. The Contractor agrees that no claim for services rendered or materials furnished by the Contractor to the Subcontractor shall be valid unless written notice thereof is given by the Contractor to the Subcontractor during the first forty (40) days following the calendar month in which the claim originated.

5. This agreement is contingent upon the execution of a general contract between the Contractor and the Awarding Authority for the complete work.

IN WITNESS WHEREOF, the parties hereto have executed this agreement the day and year first above-written.

| Subcontractor | | |
|---|----------------------------|----------------------------------|
|  | <input type="text"/> | |
| | Subcontractor | |
| | By: <input type="text"/> | |
| | <i>(Print Name)</i> | |
| | Its: <input type="text"/> | |
| | Duly Authorized | |
| ATTEST: <input type="text"/> | <input type="text"/> | |
| | <i>(Signature)</i> | <i>(Subcontractor Signature)</i> |
| Date: <input type="text"/> | Date: <input type="text"/> | |
| Contractor | | |
|  | <input type="text"/> | |
| | Contractor | |
| | By: <input type="text"/> | |
| | <i>(Print Name)</i> | |
| | Its: <input type="text"/> | |
| | Duly Authorized | |
| ATTEST: <input type="text"/> | <input type="text"/> | |
| | <i>(Signature)</i> | <i>(Contractor Signature)</i> |
| Date: <input type="text"/> | Date: <input type="text"/> | |

End of Section
00 52 73 Subcontract Agreement Form



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

| | | | | | | | | | | | | | | | | | | | | | |
|--|---|---------------|--|-----------------------|----------------|-----------------|--|-------------------------------|--------|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|
| PRODUCER INSURED Contractor's Legal Name and Address | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2">CONTACT NAME:</td> </tr> <tr> <td>PHONE (A/C, No, Ext):</td> <td>FAX (A/C, No):</td> </tr> <tr> <td colspan="2">E-MAIL ADDRESS:</td> </tr> <tr> <td style="text-align: center;">INSURER(S) AFFORDING COVERAGE</td> <td style="text-align: center;">NAIC #</td> </tr> <tr> <td>INSURER A:</td> <td></td> </tr> <tr> <td>INSURER B:</td> <td></td> </tr> <tr> <td>INSURER C:</td> <td></td> </tr> <tr> <td>INSURER D:</td> <td></td> </tr> <tr> <td>INSURER E:</td> <td></td> </tr> <tr> <td>INSURER F:</td> <td></td> </tr> </table> | CONTACT NAME: | | PHONE (A/C, No, Ext): | FAX (A/C, No): | E-MAIL ADDRESS: | | INSURER(S) AFFORDING COVERAGE | NAIC # | INSURER A: | | INSURER B: | | INSURER C: | | INSURER D: | | INSURER E: | | INSURER F: | |
| CONTACT NAME: | | | | | | | | | | | | | | | | | | | | | |
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| INSURER(S) AFFORDING COVERAGE | NAIC # | | | | | | | | | | | | | | | | | | | | |
| INSURER A: | | | | | | | | | | | | | | | | | | | | | |
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| INSURER C: | | | | | | | | | | | | | | | | | | | | | |
| INSURER D: | | | | | | | | | | | | | | | | | | | | | |
| INSURER E: | | | | | | | | | | | | | | | | | | | | | |
| INSURER F: | | | | | | | | | | | | | | | | | | | | | |

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

| INSR LTR | TYPE OF INSURANCE | ADDL INSR | SUBR WVD | POLICY NUMBER | POLICY EFF (MM/DD/YYYY) | POLICY EXP (MM/DD/YYYY) | LIMITS |
|----------|--|-----------|----------|--------------------------------|--|---|--|
| | GENERAL LIABILITY <input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input checked="" type="checkbox"/> PROJECT <input type="checkbox"/> LOC | | | Policy Number must be provided | Policy Effective Date must be provided | Policy Expiration Date must be provided | EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 100,000 MED EXP (Any one person) \$ 5,000 PERSONAL & ADY INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 2,000,000 PRODUCTS - COMP/OP AGG \$ 2,000,000 |
| | AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS <input type="checkbox"/> NON-OWNED AUTOS | | | Policy Number must be provided | Policy Effective Date must be provided | Policy Expiration Date must be provided | COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ |
| | <input type="checkbox"/> UMBRELLA LIAB <input type="checkbox"/> EXCESS LIAB OCCUR CLAIMS-MADE DED RETENTION \$ | | | | | | EACH OCCURRENCE \$ AGGREGATE \$ |
| | WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N If yes, describe under DESCRIPTION OF OPERATIONS below | | N/A | Policy Number must be provided | Policy Effective Date must be provided | Policy Expiration Date must be provided | <input checked="" type="checkbox"/> WC STATUTORY LIMITS OTH-ER E.L. EACH ACCIDENT \$ 100,000 E.L. DISEASE - EA EMPLOYEE \$ 100,000 E.L. DISEASE - POLICY LIMIT \$ 500,000 |
| | Owner's and Contractor's Protective Liability Builder's Risk (include here when applicable) | | | | | | Bodily Injury or Death (per occ.) Total \$ 1,000,000 Property Damages Total (aggregate) \$ 2,000,000 Completed Value |

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

Indicate Project Number and Title here

The State of Connecticut is an Additional Insured with respect to General Liability and Umbrella/Excess Liability Insurance coverage.

If Builder's Risk and or Inland Marine/Transit Insurance is required then the State is endorsed as a Loss Payee.

| | |
|---|---|
| CERTIFICATE HOLDER State of Connecticut Department of Administrative Services, Construction Services Office of Legal Affairs, Policy and Procurement 450 Columbus Boulevard, Suite 1302 Hartford, CT 06103-1838 | CANCELLATION SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS. AUTHORIZED REPRESENTATIVE Agent of Producer |
|---|---|

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ACORD 25 (2010/05)

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End of Section
00 62 16 Certificate of Insurance

State of Connecticut
Department of Administrative Services (DAS)
Set-Aside Certificate Requirements
for Projects with Construction Costs Estimated to be Less Than \$500,000

DAS ● Construction Services ● Office of Legal Affairs, Policy, and Procurement

1.0 DAS Set-Aside Certificate

1.1 Requirements:

| | |
|--------------|---|
| 1.1.1 | All Bidders must upload a copy of their firm’s current DAS Set-Aside Certificate to CTsource with their other Bid Package Documents for this solicitation <i>prior</i> to the date and time of the Bid Opening. |
|--------------|---|

1.2 Instructions:

| | |
|--------------|---|
| 1.2.1 | To find your DAS Set-Aside Certificate , go to the DAS Search for Small/Minority Companies webpage : https://biznet.ct.gov/SDSearch/SDSearch.aspx |
| 1.2.2 | Enter your firm’s name in “Company Name” and click “Search”. |
| 1.2.3 | Click “View Certificate” under your firm’s name. |
| 1.2.4 | Print your DAS Set-Aside Certificate to PDF. |
| 1.2.5 | Save the PDF of your certificate to your computer. |
| 1.2.6 | Upload your DAS Set-Aside Certificate to CTsource with your other Bid Package Documents for this solicitation <i>prior</i> to the date and time of the Bid Opening. |
| 1.2.7 | If you have any questions regarding your certificate, visit the DAS Set-Aside Program* webpage (https://portal.ct.gov/DAS/Procurement/Supplier-Diversity/SBE-MBE-Program-Certification-Application-Small-or-Minority-Business-Enterprise) or call the DAS/Procurement Supplier Diversity Program at 860-713-5236 . *The DAS Set-Aside Program is also known as the “Supplier Diversity Program” and “Small Business Enterprise (SBE) / Minority Business Enterprise (MBE) Program”. |

**General Conditions of the Contract for Construction
 For Design-Bid-Build
 Connecticut Department of Administrative Services**

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**ARTICLE 1
DEFINITIONS**

WHENEVER THE FOLLOWING TERMS, OR PRONOUNS IN PLACE OF THEM, ARE USED THE INTENT AND MEANING SHALL BE AS FOLLOWS:

1.1 ACCEPTANCE: The Owner's acknowledgement of the Work from the Contractor upon certification by the Construction Administrator and Architect or Engineer that all Work has been completed.

1.2 ADDITIONAL OR DELETED WORK: Work required by the Department that, in the judgment of the Commissioner, involves any addition to, deduction from, or modification of the Work required by the Contract Documents.

1.3 AGENCY: The (User) Agency of the State of Connecticut having administrative authority of the facility in which the Work is being performed.

1.4 APPLICATION FOR PAYMENT, PARTIAL PAYMENT OR REQUISITION: Contractor's certified request for payment for completed portions of the Work and, if the Contract so provides, for materials or equipment suitably stored pending their incorporation into the Work.

1.5 ARCHITECT OR ENGINEER: A sole proprietor, partnership, firm, corporation or other business organization under Contract with the Owner, commissioned to prepare Contract Drawings and Specifications, to advise the Owner and in certain cases, to perform regular inspections during construction and when authorized to perform the duties of the Construction Administrator.

1.6 AS-BUILT DRAWINGS: Construction Drawings revised by the Contractor to show all significant Modifications made during the construction process.

1.7 BASE BID: Monetary value stated in the Bid Proposal Form as the sum for which the Bidder offers to perform the Work described in the Bidding Documents, exclusive of adjustments for Supplemental Bids.

1.8 BID BOND: Form of Bid Security executed by the Bidder as Principal and by a Surety to guarantee that the Bidder will enter into a Contract within a specified time and furnish any required bond as mandated by Connecticut General Statute Section 4b-92.

1.9 BIDDER: A sole proprietor, partnership, firm, corporation or other business organization submitting a Bid on the Bid Proposal Form for the Work contemplated.

1.10 BIDDING DOCUMENTS: Collectively, the Bidding Requirements and the proposed Contract Documents, including any addenda issued prior to receipt of Bids.

1.11 BID OR BID PROPOSAL FORM: A complete and duly signed proposal to perform Work (or a designated portion thereof) for a stipulated sum submitted in accordance with the Bidding Documents.

1.12 BID SECURITY: Certified check or Bid Bond submitted with Bid Proposal Form, which provides that the Bidder, if awarded the Contract, will execute such Contract in accordance with the requirements of the Bidding Documents.

1.13 BUILDER'S RISK INSURANCE: A specialized form of property insurance which provides coverage for loss or damage to the Work pursuant to the Contract Documents.

1.14 CASH ALLOWANCE: An amount established in the Contract Documents for inclusion in the Contract Sum to cover the cost of prescribed items not specified in detail, and as shown in the Allowance Schedule.

1.15 CERTIFICATE OF ACCEPTANCE: A document issued by the Owner to the Contractor stating that all Work specified in the Certificate of Acceptance has been completed and accepted by the Owner.

1.16 CERTIFICATE OF COMPLIANCE: A document stating that for the portion of the Project completed, either the design portion or the construction portion, has been performed in substantial compliance with all applicable building codes.

1.17 CERTIFICATE OF OCCUPANCY: Document issued by the authority having jurisdiction certifying that all or a designated portion of a building is approved for its designated use.

1.18 CERTIFICATE OF SUBSTANTIAL COMPLETION: A document prepared by the Architect or Engineer and approved by the Owner on the basis of an inspection stating:

1.18.1 that the Work, or a designated portion thereof, is determined to be Substantially Complete;

1.18.2 the date of Substantial Completion;

1.18.3 the responsibilities of the Owner and the Contractor for security maintenance, heat, utilities, damage to the Work and insurance; and

1.18.4 the time within which the Contractor shall complete the remaining Work.

1.19 CHANGE ORDER: Written authorization signed by the Owner, authorizing a modification in the Work, an adjustment in the Contract Sum, or an adjustment in the Contract Time.

1.20 COMMISSIONER: The State of Connecticut, Department of Construction Services (CT DCS) Commissioner acting directly or through specifically authorized CT DCS personnel or agent(s) having authority to perform duties defined in Article 25.

1.21 COMMISSIONING AGENT (CxA): An independent entity under contract directly with the Owner or Owner's Representative responsible for performing the specified commissioning procedures.

1.22 CONSTRUCTION ADMINISTRATOR: A sole proprietor, partnership, firm, corporation or other business organization, under Contract or employed by the Owner commissioned and/or authorized to oversee the fulfillment of all requirements of the Contract Documents. The authorized Construction Administrator may be a Department of Construction Services Assistant Project Manager, Department of Construction Services Project Manager, a Clerk of the Works, an Architect, a Consulting Architect, a Consulting Construction Administrator, a Consulting Engineer etc. or any other designee as authorized and identified by the Owner.

1.23 CONSTRUCTION CHANGE DIRECTIVE: A written authorization signed by the Owner, directing a modification in the Work and stating a proposed basis for adjustment, if any, in the Contract Sum, Contract Time or both. Any Construction Change Directive effecting an adjustment to the Contract Sum or Contract Time shall result in a Change Order.

1.24 CONTRACT DOCUMENTS OR CONTRACT: The Agreement between Owner and Contractor, Conditions of the Contract (General Conditions, Supplementary Conditions, General Requirements and other Conditions), Drawings, Specifications, and Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract, all of which shall constitute the Contract.

1.25 CONTRACTOR OR GENERAL CONTRACTOR: A sole proprietor, partnership, firm or Corporation, under direct Contract with the Department of Construction Services, responsible for performing the Work under the Contract Documents. Whenever the words "Contractor" or "General Contractor" are used it shall be understood to mean Contractor.

1.26 CONTRACTOR'S LIABILITY INSURANCE: Insurance purchased and maintained by the Contractor that insures the Contractor for claims for property damage, bodily injury or death.

1.27 CONTRACT START DATE OR DATE OF COMMENCEMENT OF THE WORK: The date, specified by the Owner in the Notice to Proceed, on which the Contractor is required to start the Work.

1.28 CONTRACT SUM: The sum stated in the Contract, which is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

1.29 CONTRACT TIME: The period of time allotted in the Contract Documents for Substantial Completion of the Work, including authorized adjustments thereto. The Contract Time is the sum of all Working Days and Non-Working Days as further defined herein and specified in the Contract Documents.

1.30 DAY: Whenever the word Day is used it shall be understood to mean calendar day stated on the Bidding Documents, unless stated otherwise.

1.31 DEPARTMENT OF CONSTRUCTION SERVICES (CT DCS) PROJECT MANAGER: The individual employed by the Owner, designated and authorized by the Commissioner, to be responsible for the overall management and oversight of the Project, and to represent the (User) Agency.

1.32 DIESEL VEHICLE EMISSIONS CONTROL: The reduction of air pollution emissions from diesel powered vehicles through the use of diesel engine emission control technologies.

1.33 EQUAL(S): Any deviation from the Specification which is defined as follows: A replacement for the specified material, device, procedure, equipment, etc., which is recognized and accepted as substantially equal to the first listed manufacturer or first listed procedure specified after review by the Architect/Engineer, and may be rejected or approved at the sole discretion of the Owner. All equals must be substantially equivalent to the first manufacturer or first procedure listed in the Specifications with reference to all of the following areas: the substance and function considering quality, workmanship, economy of operation, durability, and suitability for purposes intended; size, rating, and cost. The equal does not constitute a modification in the scope of Work, the Schedule, or Architect/Engineer's design intent of the specified material, device, procedure, equipment, etc.

1.34 FINAL INSPECTION: Review of the Work by the Architect or Engineer and Owner to determine whether Acceptance has been achieved.

1.35 FINAL PAYMENT: The last payment made by the Owner to the Contractor, made after notice of the Acceptance. Payment shall include the entire unpaid balance of the Contract Sum as adjusted by modifications.

1.36 GENERAL CONDITIONS: The General Conditions of the Contract for Construction, part of Division 00 of the Specifications.

1.37 GENERAL REQUIREMENTS: That part of the Contract Documents entitled General Requirements, which is Division 01 of the Specifications.

1.38 GUARANTEE: See Warranty.

1.39 LIQUIDATED DAMAGES: A sum established in a Contract, usually as a fixed sum per Day, as the predetermined measure of damages to be paid to the Owner due to the Contractor's failure to complete the Work within the Contract Time.

1.40 LUMP SUM: An item or category priced as a whole rather than broken down into its elements.

1.41 MOBILE SOURCE: A source designed or constructed to move from one location to another during normal operation except portable equipment and includes, but is not limited to, automobiles, buses, trucks, tractors, earth moving equipment, hoists, cranes, aircraft, locomotives operating on rails, vessels for transportation on water, lawnmowers, and other small home appliances.

1.42 NON-WORKING DAYS: All Saturdays, Sundays, Legal State Holidays (12), and any other Days identified in the Contract Documents that the Contractor is not permitted to execute the Work. The restriction of Non-Working Days may be suspended upon the approval or direction of the Commissioner.

1.43 NOTICE TO BIDDER: A notice contained in the Bidding Document informing prospective Bidders of the opportunity to submit Bids on a Project.

1.44 NOTICE TO PROCEED: Written notice, issued by the Commissioner or the Commissioner's authorized representative, to the Contractor authorizing the Contractor to proceed with the Work and establishing the date for commencement of the Contract Time.

1.45 OWNER OR DEPARTMENT: The State of Connecticut, Department of Construction Services acting through its Commissioner or specifically authorized Department personnel or agent.

1.46 OVERHEAD: Indirect costs including: supervision (any position over the foreman), field and home office expense, insurance, and small tools and consumables.

1.47 PAYMENT, BOND, LABOR BOND OR MATERIAL BOND: A bond in which the Contractor and the Contractor's surety guarantee to the Owner that the Contractor will pay for labor and materials furnished for use in the performance of the Contract, as required by Connecticut General Statutes Section 49-41.

1.48 PERFORMANCE BOND OR SURETY BOND: A bond in which the Contractor and the Contractor's surety guarantee to the Owner that the Work will be performed in accordance with the Contract Documents, as required by Connecticut General Statutes Section 49-41.

1.49 PERFORMANCE SPECIFICATION: A description of the desired results or performance of a product, material, assembly, procedure, or a piece of equipment with criteria for identifying the standard.

1.50 PLANS OR DRAWINGS: All Drawings or reproductions of Drawings pertaining to the construction of the Work contemplated and its appurtenances.

1.51 PROJECT: The total construction of which the Work performed under the Contract Documents may be the whole or a part.

1.52 PROJECT MANUAL: The set of documents assembled for the Work which includes, but is not limited to, Contract Documents, Bidding Requirements, Sample Forms, General Conditions of the Contract for Construction, General Requirements, and the Specifications.

1.53 PROPRIETARY SPECIFICATION: A specification that describes a product, procedure, function, material, assembly, or piece of equipment by trade name and/or by naming the manufacturer(s) or manufacturer's procedure, exact model number, item, etc., of those products acceptable to the Owner.

1.54 RETAINAGE: A percentage of each Application for Payment and a percentage of the total Contract Sum retained by the Owner.

1.55 SCHEDULE: A Critical Path Method (CPM) or Construction Schedule as required by the Contract Documents which shall be a diagram, graph or other pictorial or written Schedule showing all events expected to occur and operations to be performed and indicating the Contract Time, start dates, durations and finish dates as well as Substantial Completion and Acceptance of the Work, rendered in a form permitting determination of the optimum sequence and duration of each operation.

1.56 SCHEDULE OF VALUES: A document furnished by the Contractor to the Architect or Engineer and Owner stating the portions of the Contract Sum allocated to the various portions of the Work, which is to be used for reviewing the Contractor's Applications for Payment.

1.57 SECONDARY SUBCONTRACTOR: A sole proprietor, partnership, firm or Corporation under direct Contract with the Subcontractor to the General Contractor.

1.58 SENSITIVE RECEPTOR SITES: Areas where concentrations of diesel emissions may be harmful to sensitive populations, including, but not limited to, hospitals, school and university buildings being occupied during a student semester, residential structures, daycare facilities, elderly housing, and convalescent facilities.

1.59 SHOP DRAWINGS: Drawings provided to Architect or Engineer and Owner by a Contractor that illustrate construction, materials, dimensions, installation, and other pertinent information for the incorporation of an element or item into the construction as detailed Contract Documents.

1.60 SPECIFICATIONS: The description, provisions and other requirements pertaining to the method and manner of performing the Work and/or to the quantities and quality of materials to be furnished under the Contract.

1.61 SUBCONTRACTOR: A sole proprietor, partnership, corporation or other business organization under direct Contract with the Contractor supplying labor and/or materials for the Work at the site of the Project.

1.62 SUBMITTALS: Documents including, but not limited to, samples, manufacturer's data, Shop Drawing, or other such items submitted to the Owner and Architect or Engineer by the Contractor for the purpose of approval or other action, as required by the Contract Documents.

1.63 SUBSTANTIAL COMPLETION: The stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents.

1.64 SUBSTITUTION: Any deviation from the specified requirements, which is defined as follows: A replacement for the specified material, device, procedure, equipment, etc., which is not recognized or accepted as equal to the first manufacturer or procedure listed in the Specification after review by the Architect/Engineer, and may be rejected or approved by the Owner. The Substitution is not equal to the specified requirement in comparison to the first manufacturer or first procedure listed in the Specifications in one or more of the following areas: the substance and function considering quality, workmanship, economy of operation, durability, and suitability for purposes intended; size, cost, and rating. The Substitution constitutes a modification in the scope of Work, the Schedule, or the Architect/Engineer's design intent of the specified material, device, procedure, equipment, etc.

1.65 SUPERINTENDENT: The Contractor's representative at the site who is responsible for continuous field supervision, coordination, in, completion of the Work, and, unless another person is designated in writing by the Contractor to the Owner and the Construction Administrator, for the prevention of accidents.

1.66 SUPPLEMENTAL BID: The monetary value stated in the Bid to be added to the amount of the Base Bid if the corresponding Work, as described in the Bidding Documents, is accepted.

1.67 SUPPLEMENTARY CONDITIONS: An extension in the Bid to be added to the amount of the Base Bid if the corresponding Work, as described in the Bidding Documents, is accepted.

1.68 THRESHOLD LIMIT BUILDING: Any proposed (new) structures or additions as defined by the Connecticut General Statutes Section 29-276b.

1.69 UNIT PRICE: The monetary value stated by the Owner or the Contractor, as a price per unit of measurement for materials or services as described in the Contract Documents and/or Bidding Documents.

1.70 WARRANTY: A written, legally enforceable assurance of specified quality or performance of a product or Work or of the duration of satisfactory performance.

1.71 WORK: The construction and services required by the Contract Documents, and including all labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project and "Work Phase".

1.72 WORK PHASE: Construction of the Project by sequence or time intervals, which may include but not be limited to separate Construction Start Dates, Substantial Completion Dates, Application for Payments, Change Orders, Liquidated Damages, Retainage, and Subcontractors for each Work Phase.

ARTICLE 2 **CONDITIONS OF WORK**

2.1 The Contractor shall carefully examine and study the conditions under which the Work is to be performed and the site of the Work, and compare the Contract Documents with each other and to information furnished by the Owner including but not limited to the Plans and Specifications, the form of the Contract, General Conditions, Supplementary Conditions, General Requirements, Bonds and all other Contract Documents associated with the Work.

2.2 The Contractor shall report to the Construction Administrator all errors, inconsistencies or omissions discovered. The Contractor shall not be liable to the Owner for damage resulting from errors, inconsistencies or omissions in the Contract Documents unless the Contractor recognized such errors, inconsistencies or omission and failed to report it to the Construction Administrator. If the Contractor performs any actions or construction activity knowing it involves an error, inconsistency or omission in the Contract Documents without notice to the Construction Administrator, the Contractor shall assume responsibility for such performance and related costs for the correction and shall not be allowed to submit any claim related to error, inconsistencies or omission.

2.3 The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies or omissions discovered shall be reported to the Construction Administrator at once; and it will be assumed that the Contractor has been satisfied as to all requirements of the Contract Documents. Any deterrent conditions at the site of the Work which are obvious and apparent upon examination of the site but are not indicated on the Plans shall be corrected by the Contractor without additional compensation.

2.4 In performing the Work, the Contractor must employ such methods or means as will not cause any interruption of or interference with the Work of any other Contractor, nor any inordinate disruption with the normal routine of the Owner, institution or Agency operating at the site.

2.5 No claims for additional compensation will be considered when additional costs result from conditions made known to, discovered by, or which should have been discovered by, the Contractor prior to Contract signing.

2.6 All Communications from the Contractor concerning proposed changes to the Contract Sum, Contract Time, or Work shall be in writing.

2.7 The Contractor shall perform the Work in accordance with the Contract Documents and approved Submittals pursuant to Article 5.

ARTICLE 3 **CORRELATION OF CONTRACT DOCUMENTS**

3.1 The Contract Documents are complementary, and what is called for by any one shall be as binding as if called for by all. Where discrepancies or conflict occur in the Contract Documents the following order of precedence shall be utilized:

3.1.1 Amendments and addenda shall take precedence over previously issued Contract Documents.

3.1.2 The Supplementary Conditions take precedence over the General Conditions.

3.1.3 The General Conditions take precedence over the General Requirements.

3.1.4 The Specifications shall take precedence over the Plans.

3.1.5 Stated dimensions shall take precedence over scaled dimensions.

3.1.6 Large-scale detail Drawings shall take precedence over small-scale Drawings.

3.1.7 The Schedules contained in the Contract Documents shall take precedence over other data on the Plans.

3.2 Neither party to the Contract shall take advantage of any obvious error or apparent discrepancy in the Contract Documents. The Contractor shall give immediate written notification of any error or discrepancy discovered to the Construction Administrator, who shall take the necessary actions to obtain such corrections and interpretations as may be deemed necessary for the completion of the Work in a satisfactory and acceptable manner. The Contractor shall then promptly proceed under the direction of the Owner and the provisions of Article 13. The Contractor's failure to provide immediate notice shall mean the Contractor will not be entitled to any additional compensation, either monetary or Contract Time adjustment, with respect to any discrepancy.

3.3 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

3.4 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings, shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

3.5 Unless otherwise stated in the Contract Documents, words which have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

3.6 In accordance with C.G.S. Section 4a-1, wherever the term "Commissioner of Construction Services" is used in the "Bidding Documents" or "Project Manual" the term "Commissioner of Administrative Services" shall be substituted in lieu thereof; and wherever the term "Department of Construction Services" is used in "Bidding Documents" or "Project Manual", the term "Department of Administrative Services" shall be substituted in lieu thereof.

ARTICLE 4 **COMMENCEMENT AND PROGRESS OF WORK**

4.1 The Work shall start upon the date given in the Notice to Proceed. The Contractor shall complete all the Work necessary for Final Payment, including but not limited to Substantial Completion, Contract close-out, testing and demonstration of all systems as required for Acceptance, punchlist Work, training and submission of Record Documents, manuals, Guarantees and Warranties as stated in the Contract Document.

4.2 Time is of the essence with respect to the Contract Time. By executing the Contract, the Contractor confirms and agrees that the Contract Time is a reasonable period to perform the Work. The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time. The Contractor may, at his discretion, plan to complete the Work and achieve Substantial Completion in less time than the Contract Time.

4.3 The Contractor's early completion Schedule notwithstanding, the Owner reserves the right to order Modifications to the Work in accordance with Article 13 at any time during the Contract Time.

4.4 The Contractor shall not be entitled to costs for delay due to Owner ordered Modifications or any other circumstances for the period of time between the Contractor's elected early completion and the end of the Contract Time. Such costs include, but are not limited to, extended home office costs, field office costs, or supervisory and management costs incurred in performance of the Work. Early completion of the Work shall not merit additional compensation.

4.5 If the Contractor is delayed at any time in the progress of Work by acts of God, such as fire or flood or any action, injunction or stop order issued by any court, judge or officer of the court or any other court action beyond the Owner's control, then the Contract Time may be extended by Change Order for such reasonable time as demonstrated by the Contractor's Schedule and as the Owner may determine that such event has delayed the Work. In any event, the granting of an extension of time shall be solely within the discretion of the Owner.

4.6 Except as otherwise may be provided herein, extensions of time shall be the Contractor's sole remedy for such delay. No payment or compensation of any kind shall be made to the Contractor for damages because of hindrance in the orderly progress of Work caused by the aforesaid causes.

4.7 The Contractor acknowledges that the Contract amount includes and anticipates any and all delays, whether avoidable or unavoidable, from said orders, which may issue from any court, judge, court officer, or act of God, and that such delays shall not, under any circumstances, be construed as compensable delays.

4.8 Any extension of the Contract Time shall be by Change Order pursuant to Article 13.

4.9 The Contractor shall employ a competent project manager who shall represent the Contractor. Communications given to the project manager shall be binding as if given to the Contractor. The project manager will be employed full time on the Project and be located and assigned to the Project site during and for the duration of the Work.

4.10 The Contractor shall employ a competent Superintendent and necessary assistants who will be in attendance at the project site during the performance of the Work.

4.11 Upon execution of the Contract, materials may be purchased. No material escalation costs will be valid or compensable unless the Owner directs, in writing, a delay in the procurement.

ARTICLE 5
SUBMITTALS, PRODUCT DATA, SHOP DRAWINGS AND SAMPLES

5.1 Contractor shall review, approve, and submit to the Construction Administrator all Submittals including but not limited to, product data, Shop Drawings, and samples, with such promptness as to cause no delay in the Work.

5.2 Correction or approval of such Submittals, Shop Drawings, product data and samples will be made with reasonable promptness by the Architect or Engineer. Approval will be general only and shall not relieve the Contractor from responsibility for errors in dimensions, for construction and field coordination of the Work or for any departure from the Contract Documents, unless such departure has received the Owner's written approval.

5.3 No Work governed by such Shop Drawings, Schedules or samples shall be fabricated, delivered or installed until approved by the Architect or Engineer.

5.4 No damages for delays or time extensions will be granted, even if approvals deviate from the approved Schedule.

ARTICLE 6
SEPARATE CONTRACTS

6.1 The Owner reserves the right to perform Work in connection with the Contract with the Owner's own forces, or to let separate contracts relating to the Contract (Project) site or in connection with Work on adjoining sites. In such cases, the Contractor shall afford such parties reasonable opportunity for storage of materials and equipment and coordinate and connect the Work with the work on adjoining sites or other Projects, and shall fully cooperate with such parties in the matter required under Article 7 herein.

6.2 Contractors working in the same vicinity shall cooperate with one another and, in case of dispute, decision of the Owner shall be final and binding to all Contractors involved, including Contractors under separate Contracts.

6.3 The Contractor shall assume all liability, financial or otherwise, in connection with this Contract and shall protect and hold harmless the Owner from any and all damages or claims that may arise because of inconvenience or delay which the Contractor may cause other Contractors. If the Contractor experiences a loss because of the presence and operations of other Contractors working adjacent to or within the limits of the same Project, then as between the Owner and the Contractor, the Contractor shall bear such loss.

6.4 Insofar as possible, the Contractor shall arrange the Work and shall place and dispose of the materials being used so as not to interfere with the operations of other Contractors adjacent to or within the limits of the same Project. The Contractor shall join its Work with that of others in an acceptable manner, and perform the Work in proper accordance with that of the others.

6.5 In no event shall the Owner be responsible for any claim or damages that are the result of the Contractor's failure to coordinate the Work with any other Contractor or Subcontractor.

**ARTICLE 7
COOPERATION OF TRADES**

7.1 The Contractor shall be responsible for and shall control all activities of their Subcontractors. The Subcontractors shall consult and cooperate with one another. Each Subcontractor shall furnish all necessary information to other Subcontractors and shall lay out and install their own Work so as to avoid any delays or interference with the Work of others.

7.2 Any cost or changes, cutting and/or repairing, made necessary by the failure to observe the above requirements shall be borne by the party or parties responsible for such failure or neglect or their faulty Work installed.

**ARTICLE 8
DAMAGES**

8.1 The Liquidated Damages, provided in the Bidding Documents, will be assessed at two distinct times, as follows:

8.1.1 Liquidated Damages – Substantial Completion:

If the Contractor fails to achieve Substantial Completion of the Work by the Substantial Completion Date, and such delay is not otherwise excused under this Contract, then the Contractor agrees to pay to the Owner Liquidated Damages for the dollar amount specified in the Bid Proposal Form for this Project, for each Day beyond Substantial Completion that the Contractor fails to achieve Substantial Completion. The parties to this Contract acknowledge and agree that the actual damages that are to be anticipated as a result of the neglect, failure, or refusal of the Contractor to substantially complete the Project by the established Substantial Completion Date are uncertain in amount or extremely difficult to determine. Accordingly, the parties to this Contract do intend and in fact now agree to liquidate damages in advance and stipulate that the amount set forth in this subparagraph is reasonable and an appropriate remedy and is intended to constitute compensatory damages and does not constitute a penalty of any kind. The parties understand and agree that, by including a provision for Liquidated Damages in this Contract, or in pursuing any relief pursuant to such provision:

- .1 the parties do not intend to set a price for the privilege not to perform;
- .2 the availability of Liquidated Damages may not be relied upon as a basis for argument that the Owner has an adequate remedy at law; and
- .3 the remedies available to the Owner under this Agreement are cumulative and not exclusive.

8.1.2 Liquidated Damages – Acceptance:

If the Contractor fails to complete all of the Work required for Acceptance of the Work within ninety (90) Days of Substantial Completion then the Contractor agrees to pay to the Owner Liquidated Damages for the dollar amount specified in the Bid Proposal Form for each Day in excess of ninety (90) Days beyond the Substantial Completion Date that the Contractor fails achieve Acceptance. The parties to this Contract acknowledge and agree that the actual damages that are to be anticipated as a result of the failure of the Contractor to complete all of the Work required for Acceptance within ninety (90) Days of the established Substantial Completion Date are uncertain in amount or extremely difficult to determine. Accordingly, the parties to this Contract do intend and in fact now agree to liquidate damages in advance and stipulate that the amount set forth in this subparagraph is reasonable and an appropriate remedy and is intended to constitute compensatory damages and does not constitute a penalty of any kind. The parties understand and agree that, by including a provision for Liquidated Damages in this Contract, or in pursuing any relief pursuant to such provision:

- .1 the parties do not intend to set a price for the privilege not to perform;
- .2 the availability of Liquidated Damages may not be relied upon as a basis for argument that the Owner has an adequate remedy at law; and
- .3 the remedies available to the Owner under this Agreement are cumulative and not exclusive.

8.2 The Liquidated Damages or any portion thereof may be waived at the sole discretion of the Commissioner.

8.3 No payment by the Owner, either partial or final, shall be construed to waive the Owner's right to seek Liquidated Damages.

8.4 In the event a court determines that the Contract herein is null and void for any reason, Contractor agrees that Contractor will not seek or pursue any lawsuit or claim for damages, including, but not limited to, claims for loss of Overhead or anticipated profits, against the Owner and the Owner shall not be liable for any damages which Contractor may incur as a result of such decision. In addition, if the court enjoins the Owner from entering into or proceeding with the Contract herein, the Owner shall not be liable for any damages arising out of or relating to the award of such Contract which Contractor may have incurred as a result of the injunction.

ARTICLE 9
MINIMUM WAGE RATES

9.1 In accordance with the provisions of the Connecticut General Statutes Section 31-53, the following applies:

"The wages paid on an hourly basis to any person performing the work of any mechanic, laborer, or worker on the work herein contracted to be done and the amount of payment or contribution paid or payable on behalf of each such person to any employee welfare fund, as defined in subsection (h) of this section, shall be at a rate equal to the rate customary or prevailing for the same work in the same trade or occupation in the town in which such public works project is being constructed. Any contractor who is not obligated by agreement to make payment or contribution on behalf of such persons to any such employee welfare fund shall pay to each mechanic, laborer or worker as part of such person's wages the amount of payment or contribution for such person's classification on each payday."

9.2 Each Contractor who is awarded a Contract on or after October 1, 2002 shall be subject to provisions of the Connecticut General Statutes, Section 31-53 as amended by Public Act 02-69, "An Act Concerning Annual Adjustments to Prevailing Wages." No wage adjustment will be made to the Contract for any wage increase under this Article.

ARTICLE 10
POSTING MINIMUM WAGE RATES

10.1 The Contractor shall post at conspicuous points on the site of the Contract a Schedule showing all determined wage rates for all trades and all authorized deductions, if any, from wages to be paid.

10.2 The Contractor shall provide weekly certified payrolls to the Owner for all persons working on the site.

ARTICLE 11
CONSTRUCTION SCHEDULES

11.1 Unless otherwise specified in the Contract Documents, within twenty-one (21) Days from the Contract Start Date, the Contractor shall submit the following to the Owner for approval:

11.1.1 A comprehensive Schedule of Submittals required by the Specifications. Said Schedule shall include Submittal dates, required approval dates and date material must be on site.

11.1.2 The Contractor shall allow a minimum of 14 Days for the Owner and its agents' review of Submittals. No extension of the Contract Time shall be granted for revisions and resubmission. Further, the Contractor shall allow a minimum of eight weeks for testing and Acceptance of the Work by the Owner.

11.1.3 When the Contract Documents specify a "CPM Schedule" a detailed Critical Path Method Schedule is required using software approved by the Owner and/or Construction Administrator with as many activities as necessary to make the Schedule an effective tool for planning and monitoring the progress of the Work. The Contractor shall show all pertinent activities requiring coordination between trades.

11.1.4 When the Contract Documents specify a "Construction Schedule" a detailed Construction Schedule is required using software approved by the Owner as a horizontal bar chart with a separate bar for each major portion of the Work or operation to make the Schedule an effective tool for planning and monitoring the progress of the Work.

11.2 Unless otherwise specified under the Contract Documents, the Contractor shall provide a monthly update of the CPM Schedule or Construction Schedule in the format required by the Owner as well as a disk of the updated Schedule and program. If, in the opinion of the Owner, the Work is falling behind Schedule, the Contractor shall submit a revised Schedule demonstrating a recovery plan to ensure Substantial Completion of the Work within the Contract Time.

11.3 Overtime, increased manpower, and additional shifts: If ordered by the Owner in writing, the Contractor shall work overtime, and/or add additional manpower and/or shifts:

11.3.1 If the Contractor is not behind Schedule, the Owner will pay the Contractor the actual additional premium portion of the wages for overtime or additional shift work not included in the Contract price, but the Contractor shall not be entitled to Overhead and Profit.

11.3.2 If the Contractor, through its sole or partial fault or neglect is behind Schedule, the Owner may order the Contractor, at the Contractor's expense, to increase its manpower or to work any overtime or additional shifts or take other action necessary to expedite the Work to meet the Project Schedule.

11.3.3 If the Schedule is shown to be more than 21 Days behind in any critical activity, overtime, increase manpower and/or additional shifts shall be implemented immediately regardless of who is at fault. A disagreement over the cause of the impact will not relieve the Contractor from the obligation of complying with this Article. Once liability for the impact is determined, compensation will be determined in accordance with 11.3.1 or 11.3.2.

11.3.4 The Owner reserves the right to suspend activity under Paragraph 11.3. Suspension shall be in writing and at the sole discretion of the Commissioner.

11.4 Requisitions for partial payment will not be processed until the Contractor has complied with this requirement.

ARTICLE 12 **PREFERENCE IN EMPLOYMENT**

12.1 Should this Contract be for the construction or repair of any building, then in the employment of labor to perform the Work specified herein, preference shall be given to citizens of the United States, who are, and continuously for at least three (3) months prior to the date hereof, have been residents of the labor market area, as established by the State of Connecticut Labor Commissioner, in which such Work is to be done, and if no such qualified person is available, then to citizens who have continuously resided in the county in which the Work is to be performed for at least three (3) months prior to the date hereof, and then to citizens of the state who have continuously resided in the State at least three months prior to the date hereof.

12.2 Should this Contract be for a public works project other than for the construction, remodeling or repairing of public buildings covered by Connecticut General Statutes 31-52, then in the employment of mechanics, laborers or workmen to perform the Work specified herein, preference will be given to residents of the state who are, and continuously for at least six (6) months prior to the date hereof have been residents of this State, and if no such person is available then to residents of other states.

12.3 The provisions of this Article shall not apply where the state or any subdivision thereof may suffer the loss of revenue granted or to be granted from any Agency or Department of the federal government as a result of this Article or regulations related thereto.

ARTICLE 13 **COMPENSATION FOR CHANGES IN THE WORK**

13.1 At any time, without invalidating the Contract and by a written order and without notice to the sureties, the Owner, through the Construction Administrator, may order modifications in the Work consisting of additions, deletions or other revisions. Upon request, the Contractor shall supply the Construction Administrator promptly with a detailed proposal for the same, showing quantities of and Unit Prices for the Work and that of any Subcontractor involved.

13.2 Modifications to the Work will be authorized by a written Change Order, or if necessary to expedite the Work, a written Construction Change Directive, issued by the Owner as provided for in Article 25. Change Orders and Construction Change Directives shall be processed in accordance with the terms of the Contract Documents. Upon receipt of the written Change Order, the Contractor shall proceed with the Work when and as directed.

13.3 If a Change Order makes the Work less expensive for the Contractor, the proper deductions shall be made from the Contract Sum, said deductions to be computed in accordance with the provisions listed in this Article 13.

13.4 The Contractor shall not be entitled to an extension of time if in the opinion of the Owner the Additional Work in conjunction with the Work can be performed without impact on the Contract Time.

13.5 The Contractor may request, and the Owner may grant additional Contract Time when, in the opinion of the Owner, the Contractor has demonstrated that the Additional Work cannot be performed in conjunction with the Work without impact on the original Substantial Completion and/or Acceptance (if applicable) date.

13.6 The amount of compensation to be paid to the Contractor for any Additional or Deleted Work that results in a Change Order shall be determined in one of the following manners:

13.6.1 AMOUNT OF COMPENSATION FOR CHANGE ORDER COSTS: LABOR, EQUIPMENT, BENEFITS AND MATERIAL:

13.6.1.1 Unit Price: As stated in the Contract Documents.

13.6.1.2 Unit Price: As subsequently agreed upon by the Contractor and Owner

13.6.1.3 Lump Sum: Agreed upon sum by the Owner and the Contractor. The Owner may rely on costs, prices, and documentation provided by the Contractor or Subcontractor in agreeing to a Lump Sum. If the Owner believes that additional information is necessary to substantiate the accuracy of the cost, the Owner reserves the right to request and receive additional information from the Contractor. The Lump Sum must be based upon the following itemized costs:

13.6.1.3.1 Labor: (Contractor's or Subcontractor's own forces) No Change Order Proposal shall be negotiated if the request is solely for the increased labor rate over those originally carried by the Contractor in its original bid. Additional foreman hours shall not be included unless additional crews are added and/or a compensable time extension is granted. Project Executive time shall not be included as a direct cost as it is part of the overhead mark-up allowed. Project manager hours shall not be included unless a compensable time extension is granted.

13.6.1.3.2 Material: (Actual cost to the Contractor or Subcontractor) Cost shall not be based upon list pricing unless it reflects the actual prices being paid and no discounts or other offsets are being received by the Contractor or Subcontractor. No Change Order Proposal shall be negotiated if the request is solely for the escalation of material prices over those originally carried by the Contractor in its original bid.

13.6.1.3.3 Benefits: (The established rates of the following benefit costs inherent to the particular labor involved):

13.6.1.3.3.1 Workers Compensation.

13.6.1.3.3.2 Federal Social Security.

13.6.1.3.3.3 Connecticut Unemployment Compensation.

13.6.1.3.3.4 Fringe Benefits.

13.6.1.4 Rented Equipment: (Used directly on the Work and by the Contractor's or Subcontractor's own forces).

13.6.1.5 Owned Equipment: (Used directly on the Work and by the Contractor's or Subcontractor's own forces). Daily rate is not to exceed 3% of the monthly rental rate as identified by a nationally recognized construction cost estimating guide or service.

13.6.1.6 Small Tools:

Include items such as shovels, picks, rakes, ladders, and power tools which are expected to be utilized on a project. Trade related equipment, hand tools, and power tools normally supplied with the labor or are normally expected to be owned in the performance of the typical work for a trade are not compensable. These costs shall not be approved as part of the Direct Cost of a Change Order as they are included in the Contractor's overhead mark-up percentage.

13.6.2 OVERHEAD AND PROFIT PERCENTAGES: (Maximum allowable percentages applied to labor, equipment, and material)

13.6.2.1 Contractor's mark-up for Work performed by its own forces:

| Change Order Amount | Overhead and Profit |
|----------------------|---------------------|
| \$0 to \$5,000 | 20% |
| \$5,001 to \$15,000 | 17% |
| \$15,001 to \$25,000 | 15% |
| \$25,000 and greater | 12% |

13.6.3 OVERHEAD AND PROFIT PERCENTAGES: (Maximum allowable percentages applied to labor, equipment, benefits and material)

13.6.3.1 Contractor's mark-up for Work performed by its Subcontractor's forces and not allowable for any subsidiary in which the Contractor has a majority ownership:

| Change Order Amount | Overhead and Profit |
|---------------------|---------------------|
| \$0 and greater | 6% |

13.6.4 OVERHEAD AND PROFIT PERCENTAGES: (Maximum allowable percentages applied to labor, equipment, benefits and material) Subcontractor's mark-up for Work performed by its own forces:

| Change Order Amount | Overhead and Profit |
|----------------------|---------------------|
| \$0 to \$5,000 | 20% |
| \$5,001 to \$15,000 | 17% |
| \$15,001 to \$25,000 | 15% |
| \$25,000 and greater | 12% |

13.6.5 OVERHEAD AND PROFIT PERCENTAGES: (Maximum allowable percentages applied to labor, equipment, benefits and material)

13.6.5.1 Subcontractor's mark-up for Work performed by its Secondary Subcontractor's forces. Limited to one level (tier) below the Subcontractor and not allowable for any subsidiary in which the Subcontractor has a majority ownership.

| Change Order Amount | Overhead and Profit |
|---------------------|---------------------|
| \$0 and greater | 6% |

13.7 BOND COSTS

13.7.1 Actual additional bonding costs associated with the value of the Change Order will be compensable only when supported by written documentation by the bonding company that the Change Order requires an increase to the original Performance, Payment, Labor or Material Bond.

13.7.2 The Contractor shall notify the bonding company at each \$500,000 increase to the contract value as the cumulative result of change orders. A copy of the Consent of Surety must be provided to the Owner prior to the execution of any change order which exceeds each cumulative \$500,000.

13.8 Trade discounts, rebates, and amounts received from the sales by the Contractor of surplus materials and equipment shall accrue to the Owner.

13.9 If the parties cannot agree upon a Lump Sum, then the Commissioner, through the Project Manager, may at the option of the Commissioner take the following action(s):

13.9.1 Issue a Construction Change Directive for the Additional or Deleted Work. The amount of compensation shall be computed by the actual net costs to the Contractor determined by time and material or Unit Prices based upon the same information required in Subparagraphs 13.6.1.3.3.1 through 13.6.1.5:

13.9.1.1 Labor: (Contractor's or Subcontractor's own forces).

13.9.1.2 Material: (Used by Contractor's or Sub-contractor's own forces).

13.9.1.3 Benefits: (The established rates of the following benefit costs inherent to the particular labor involved):

13.9.1.3.1 Workers Compensation.

13.9.1.3.2 Federal Social Security.

13.9.1.3.3 Connecticut Unemployment Compensation.

13.9.1.3.4 Fringe Benefits.

13.9.1.4 Rented Equipment: (Used directly on the Work and by the Contractor's or Subcontractor's own forces).

13.9.1.5 Owned Equipment: (Used directly on the Work and by the Contractor's or Subcontractor's own forces). Daily rate is not to exceed 3% of the monthly rental rate that can be identified by a nationally recognized construction cost estimating guide or service.

13.9.2 Issue a Change Order adjusting the Contract Sum in the amount as determined by the Commissioner.

13.10 For any Change Order or Construction Change Directive the Contractor shall, when requested, promptly furnish in a form satisfactory to the Construction Administrator and the Owner a complete detailed accounting of all costs relating to the Additional Work, including but not limited to certified payrolls and copies of accounts, bills and vouchers to substantiate actual costs. Further, the Owner reserves the right to access and make copies of the Contractor's records at any time upon written request from the Commissioner.

13.11 Failure of the Contractor to negotiate in good faith issues of time and costs or failure to provide requested documentation within fourteen (14) Days, or a time period accepted by the Commissioner, shall constitute a waiver by the Contractor of any claim. In such cases the Owner may elect to issue a unilateral Change Order in an amount deemed to be fair and equitable by the Commissioner. The provisions hereof shall not affect the power of the Contractor to act in case of emergency, threatened injury to persons, or damage to Work on any adjoining property. In this case the Commissioner, through the Project Manager, shall issue a Change Order for such amount as the Commissioner finds to be reasonable cost of such Work.

ARTICLE 14 **DELETED WORK**

14.1 Without invalidating any of the terms of the Contract, the Commissioner may order deleted from the Contract any items or portions of the Work deemed necessary by the Commissioner.

14.2 The compensation to be deducted from the Contract Sum for such deletions shall be determined in the manner provided for under the provisions of Article 13 or in the event none of the provisions of Article 13 are applicable then by the value as estimated by the Owner.

ARTICLE 15 **MATERIALS: STANDARDS**

15.1 Unless otherwise specifically provided for in the Specifications, all equipment, materials and articles incorporated in the Work are to be new and of the best grade of their respective kinds for the purposes. Wherever in the Contract Documents a particular brand, make of material, device, or equipment is shown or specified, the first manufacturer listed in the specification section is to be regarded as the standard. When the specification is proprietary and only one manufacturer is listed, the Contractor shall use the named manufacturer and no Substitutions or Equals will be allowed.

15.2 Any other brand, make of material, device, equipment, procedure, etc. which is a deviation from the specified requirement is prohibited from use, but may be considered by the Owner for approval as an Equal or Substitution. The Contractor is to adhere to the specific requirements of the Contract Documents. Substitutions are discouraged and are only approved by the Commissioner as an exception.

15.3 Submittals – Equals and Substitution Requests:

15.3.1 Substitution of Materials and Equipment before Bid Opening. The Owner will consider requests for Equals or Substitutions, if made prior to the receipt of the Bid. The information on all materials shall be consistent with the information herein.

15.3.1.1 Statement of Variances – a statement of variances must list all features of the proposed Substitution which differ from the Drawings, Specifications and/or product(s) specified and must further certify that the Substitution has no other variant features. A request will be denied if submitted without sufficient evidence.

15.3.1.2 Substitution Denial – any Substitution request not complying with the above requirements will be denied. Substitution request sent after the deadline established in the Notice to Bidder will be denied.

15.3.1.3 An addendum shall be issued to inform all prospective Bidders of any accepted Substitution in accordance with Owner's addenda procedures.

15.3.2 Substitution of Materials and Equipment After Bid Opening: Subject to the Architect or Engineer's determination, if the material or equipment is Equal to the one specified or pre-qualified and the CT DCS Project Manager's approval of such determination, Substitution of Material or Equipment may be allowed after the Letter of Award is issued only:

15.3.2.1 If the specified or pre-qualified item is delayed by unforeseeable contingencies beyond the control of the Contractor which would cause a delay in the Project completion;

15.3.2.2 If any specified or pre-qualified item is found to be unusable or unavailable due to a change by the manufacturer or other circumstances; or

15.3.2.3 If the Contractor desires to provide a more recently developed material, equipment, or manufactured model from the same named manufacturer than the one specified or pre-qualified; or

15.3.2.4 If the specified material and/or equipment inadvertently lists only a single manufacturer.

15.4 Contractor shall submit each request for Equal or Substitution to the Architect or Engineer who shall review each request and make the following recommendations to the Owner:

15.4.1 Acceptance or non-acceptance of the adequacy of the submission and required back-up,

15.4.2 Determination of the category of the request for Substitution or Equal, and

15.4.3 Overall recommendation for approval or rejection of the Substitution or Equal. The determination of the category as a Substitution may be grounds for an immediate rejection by the Owner.

15.5 Approval of the Owner for each Equal or Substitution shall be obtained before the Contractor proceeds with the Work. The decision of the Commissioner, in this regard, shall be final and binding on the Contractor.

15.6 No extension of time will be allowed for the time period required for consideration of any Substitution or Equal. No extension of time will be allowed and no responsibility will be assumed by the Owner when a Contractor submits a request for Substitution or Equal, whether such request be approved or denied, and the Contractor shall not be entitled to any claim for damages for delay.

15.7 If the Contractor submits any request for an Equal or a Substitution, he shall bear the burden of proof that such requested Equal or Substitution meets the requirements of the Plans and Specifications.

15.8 The Contractor shall purchase no materials or supplies for the Work which is subject to any chattel mortgage or which are under a conditional sale or other agreement by which an interest is retained by the seller. The Contractor warrants that the Contractor has good title to all materials and supplies used by him in the Work.

15.9 All products and systems supplied to the State as a result of a purchase by a Contractor shall be certified that, to the best of the supplier's knowledge, there are no materials that are classified as hazardous materials being used within the assembly. Hazardous materials include, but are not limited to, products such as asbestos, lead, and other materials that have proven to cause a health risk by their presence.

ARTICLE 16 **INSPECTION AND TESTS**

16.1 The purpose of the inspections will be to assure that the Work is performed in accordance with the Contract Documents. These inspections shall include, but not be limited to, all inspections and testing as required by the Owner, and any authorities have jurisdiction.

16.2 All material and workmanship, if not otherwise designated by the Specifications, shall be subject to inspection, examination and test by the Commissioner at any and all times during manufacture and/or construction and at any and all places where such manufacture and/or construction is carried on. The Contract Documents additionally identify the parties responsible for performing and paying for the required testing and inspections. All required tests performed in a laboratory will be obtained and paid for by the Owner, except when the tests show the Work to be defective. The Contractor shall pay for all the costs associated with re-tests and re-inspections for all tests and inspections which fail. The Owner will issue a deduct Change Order to recover said retesting costs from the Contractor. All other tests, unless otherwise specified, shall be made at the Contractor's expense. Notice of the time of all tests to be made at the site shall be given to all interested parties, including the Owner.

16.3 Without additional cost to the Owner, the Contractor shall promptly furnish facilities, labor and materials necessary to coordinate and perform operational tests and checkout of the Work. The Contractor shall furnish promptly all reasonable facilities, labor, and materials necessary to make all such testing safe and convenient.

16.4 If, at any time before final payment and Acceptance of the Work, the Commissioner considers it necessary or advisable to examine of any portion of the Work already completed by removing or tearing out the same, the Contractor shall, upon request, furnish promptly all necessary facilities, labor, and materials. If such Work is found to be defective in any material respect, as determined by the Owner, because of a fault of the Contractor or any of the Contractor's Subcontractors, or if any Work shall have been covered without the approval or consent of the Commissioner (whether or not it is found to be defective), the Contractor shall be liable for testing costs and all costs of correction, including removal and/or demolition of the defective Work, including labor, material, and testing, including labor, material, re-testing or re-inspecting, services of required consultants, additional supervision, the Commissioner's and the Construction Administrator's administrative costs, and other costs for services of other consultants.

16.5 Cost of Systems Commissioning Retesting: The cost to retest a pre-functional or functional test, if the Contractor is responsible for the deficiency, shall be the Contractor's. If the Contractor is not responsible, any cost recovery for retesting costs shall be negotiated with the Contractor.

16.5.1 For a deficiency identified, not related to any pre-functional checklist or start-up fault, the following shall apply: The Commissioning Agent (CxA) and Construction Administrator will direct the retesting of the equipment once at no "charge" to the Contractor for their time. However, the Commissioning Agent's and Construction Administrator's time for additional testing will be charged to the Contractor.

16.5.2 The time for the Systems Commissioning Agent and Construction Administrator to direct any retesting required because a specific pre-functional checklist or start-up test item, reported to have been successfully completed, but determined during functional testing to be faulty, will be back charged to the Contractor.

16.5.3 Any required retesting by any Subcontractor shall not be considered a justified reason for a claim of delay or for a time extension by the Contractor.

ARTICLE 17 **ROYALTIES AND PATENTS**

17.1 If the Contractor desires to use any design, device, material or process covered by a patent or copyright, the Contractor shall provide for such use by suitable legal agreement with the holder of said patent or copyright. The Contractor shall furnish a copy of this legal agreement to the Owner.

17.2 The Contractor shall indemnify and hold harmless the Owner and Construction Administrator for any costs, expenses and damage which it may be obliged to pay by reason of any infringement of a patent or a copyright, at any time during the prosecution or after the Final payment of the Work.

ARTICLE 18
SURVEYS, PERMITS AND REGULATIONS

18.1 Unless otherwise provided for, the Contractor shall furnish surveys necessary for the execution of the Work. The Owner will furnish the Contractor with two base lines and a benchmark.

18.2 The Contractor shall obtain and pay for permits and licenses necessary for the execution of the Work and the occupancy and use of the completed Work.

18.3 The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations including building and fire safety codes relating to the performance of the Work.

18.4 If underground utilities may be involved in part of the Work the Contractor is required to request "Call-Before-You-Dig" to verify the location of underground utilities at least (3) Working Days, as further defined under Paragraph 1.71 herein, prior to the start of any excavation. The Contractor shall also notify the Owner and Agency at least (3) Working Days prior to the start of any excavation. If "Call-Before-You-Dig" fails or refuses to respond to the Contractor's request, then the Contractor shall obtain the services of a qualified underground utility locating firm, at no additional cost to the Owner, to verify locations of underground utilities prior to the start of any excavation. The Contractor shall be held responsible for providing safety, protecting the Work and protecting workmen as necessary to perform the Work. The Contractor shall be responsible for maintaining and protecting all original utility mark-out at no additional cost to the Owner.

ARTICLE 19
PROTECTION OF THE WORK, PERSONS AND PROPERTY

19.1 The Contractor shall continuously and adequately protect the Work against damage from any cause, and shall protect materials and supplies furnished by the Contractor or Subcontractors, whether or not incorporated in the Work, and shall make good any damage unless it be due directly to errors in the Contract Documents or is caused by agents or employees of the Owner.

19.2 To the extent required by law, by public authority, or made necessary in order to safeguard the health and welfare of the personnel or occupants of any of the state institutions, the Contractor shall adequately protect adjacent property and persons, and provide and maintain all facilities, including but not limited, to passageways, guard fences, lights, and barricades necessary for such protection.

19.3 The Contractor shall take all necessary precautions for the safety of employees on the Work and shall comply with applicable provisions of federal and state safety laws and building codes to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed. The Contractor shall also comply with the applicable provisions of the Associated General Contractors' "Manual of Accident Prevention in Construction", the standards of the Connecticut Labor Department and Occupational Safety and Hazard Association (OSHA).

19.4 The Contractor shall erect and properly maintain at all times, as required by the conditions and progress of the Work, all necessary safeguards for the protection of employees of the State and the public, and shall post danger signs warning against any dangerous condition or hazard created by such things as protruding nails, well holes, elevator hatchways, scaffolding, window openings, excavations, tripping hazards or slipping, stairways and falling materials.

19.5 The Contractor shall designate a qualified and responsible on-site staff person, whose duty shall be the prevention of accidents. The name and position of the designated person shall be reported to the Owner by the Contractor at the commencement of the Contract.

19.6 The Contractor shall at all times protect excavations, trenches, buildings, and all items of Work from damage by rain, water from melted snow or ice, surface water run off and subsurface water usual for the vicinity at the time of operations; and provide all pumps and equipment and enclosures to insure such protection.

19.7 The Contractor shall construct and maintain all necessary temporary drainage and provide all pumping necessary to keep excavation, basements, footings and foundations free of water.

19.8 The Contractor shall remove all snow and ice as may be required for access to the site and proper protection and prosecution of the Work.

19.9 The Contractor shall install bracing, shoring, sheathing, sheet piling, caissons and any other underground facilities as required for safety and proper execution of the Work, and shall remove this portion of the Work when no longer necessary.

19.10 During cold weather the Contractor shall protect all Work from damage. If low temperature makes it impossible to continue operations safely in spite of cold weather precautions, the Contractor may cease Work upon the written approval of the Commissioner.

**ARTICLE 20
TEMPORARY UTILITIES**

20.1 Unless expressly provided for otherwise in the Contract Documents, the Contractor shall include in the proposed contract bid price as stated on the Bid Proposal Form, the costs of all temporary utilities required for Project completion and protection of the Work. Said temporary utilities include, but are not limited to, lighting, heating, cooling, electrical power, water, telephone, sanitary facilities, and potable water.

**ARTICLE 21
CORRECTION OF WORK**

21.1 The Contractor shall promptly and without expense to the Owner remove from the premises all materials rejected by or unacceptable to the Commissioner as failing to conform to the Contract Documents, whether incorporated in the Work or not.

21.2 The Contractor shall promptly and without expense to the Owner replace any such materials, which do not conform to the Contract Documents, and shall bear the expense of making good all Work of other Contractors or Subcontractors destroyed or damaged by such removal or replacement.

21.3 If the Contractor, after receipt of notice from the Owner, shall fail to remove such rejected or unacceptable materials within a reasonable time as fixed in said notice, the Owner may remove and store such materials at the expense of the Contractor.

21.4 Such action shall not affect the obligation of the Contractor to replace and complete assembly and installation of the Work and to bear the expenses referred to above. Prior to the correction of rejected or unacceptable Work or if the Commissioner deems it inexpedient or undesirable to correct any portion of the Work which was rejected, deemed unacceptable, or not done in accordance with the Contract Documents, the Contract Sum shall be reduced by such amount as, in the judgment of the Commissioner, shall be equitable.

21.5 No extension of time will be given to the Contractor for correction of rejected or unacceptable Work. All significant punchlist Work shall be completed before Substantial Completion is determined. The remaining minor punchlist Work, as determined by the Commissioner, shall be completed within **ninety (90) Days** of established Substantial Completion date.

21.6 Final Payment shall not relieve the Contractor of responsibility for the defects in material or workmanship.

21.7 Unless expressly provided for otherwise in the Contract Documents, the Contractor shall remedy any rejected or unacceptable Work, and any Work found to be not conforming to the Contract Documents which is discovered within 18 Months after the date of Substantial Completion. The Contractor shall pay for any damage to other Work caused by such nonconforming Work or any damage created in correcting the nonconforming Work.

**ARTICLE 22
GUARANTEES and WARRANTIES**

22.1 Unless expressly provided for otherwise in the Contract Documents, the Contractor shall provide a Warranty on the Work for an **18-Month** period from the date of Substantial Completion. The Contractor shall warrant that the equipment, materials and workmanship are of good quality and new, unless permitted elsewhere by the Contract Documents, and that the Work shall be free from defects not inherent in the quality required or permitted and that the Work conforms to the Contract Documents.

22.2 Disclaimers and limitations from manufactures, Subcontractors, suppliers or installers to the Contractor shall not relieve the Contractor of the Warranty on the Work. The Contract Documents detail the related damages, reinstatement of Warranty, replacement cost and Owner's recourse.

**ARTICLE 23
CUTTING, FITTING, PATCHING, AND DIGGING**

23.1 The Contractor will perform or will cause the Subcontractors to perform all cutting, fitting, or patching of the portion(s) of the Work that may be required to make the several parts thereof joined and coordinated in a manner satisfactory to the Commissioner and in accordance with the Plans and Specifications.

23.2 The responsibility for defective or ill-timed Work shall be with the Contractor, but such responsibility shall not in any way relieve the Subcontractor who performed such Work. Except with the consent of the Commissioner, neither the Contractor nor any of its Subcontractors shall cut or alter the Work of any other Contractor or Subcontractor.

ARTICLE 24
CLEANING UP

24.1 The Contractor shall, on a daily basis, keep the premises free from accumulations of waste material or rubbish.

24.2 Prior to Acceptance of the Work, the Contractor shall remove from and about the site of the Work, all rubbish, all temporary structures, tools, scaffolding, and surplus materials, supplies, and equipment which may have been used in the performance of the Work. If the Commissioner in his sole discretion determines that the Contractor has failed to clean the work site, the Owner may remove the rubbish and charge the cost of such removal to the Contractor. A deduct Change Order will be issued by the Owner to recover such cost.

ARTICLE 25
ALL WORK SUBJECT TO CONTROL OF THE COMMISSIONER

25.1 The Commissioner hereby declares that the CT DCS Project Manager is the Commissioner's only authorized representative to act in matters involving the Owner's, and/or Architect's or Engineer's, ability to revoke, alter, enlarge or relax any requirement of the Contract Documents; to settle disputes between the Contractor and the Construction Administrator; and act on behalf of the Commissioner. In all such matters, the provisions of Articles 13 and 14 herein shall guide the CT DCS Project Manager.

25.2 In no event may the Contractor act on any instruction of the Agency without written consent of the Owner. In the event the Contractor acts without such consent, he does so at his own risk and at his own expense, not only for the Work performed, but for the removal of such Work as determined necessary by the Commissioner.

25.3 In the performance of the Work, The Contractor shall abide by all orders, directions, and requirements of the Commissioner at such time and places and by such methods and in such manner and sequence as the Commissioner may require.

25.4 The Commissioner shall determine the amount, quality, acceptability and fitness of all parts of the Work, shall interpret the plans, Specifications, Contract Documents and extra work orders and shall decide all other questions in connection with the Work.

25.5 The Contractor shall employ no plant, equipment, materials, methods, or persons to which the Commissioner objects and shall remove no plant materials, equipment, or other facilities from the site of the Work without the permission of the Commissioner. Upon request, the Commissioner shall confirm in writing any oral order, direction, requirement or determination.

25.6 In accordance with Section 4b-24 of the Connecticut General Statutes, the public auditors of the State of Connecticut and the auditors or accountants of the Commissioner of Construction Services shall have the right to audit and make copies of the books of any Contractor employed by the Commissioner.

ARTICLE 26
AUTHORITY OF THE CONSTRUCTION ADMINISTRATOR

26.1 The Construction Administrator employed by the Commissioner is authorized to inspect all Work for conformance to the Contract Documents. The Construction Administrator is authorized to reject all Work found to be defective, unacceptable and nonconforming to the Contract Documents. Such inspections and rejections may extend to all or any part of the Work, and to the preparation or manufacture of the material to be used.

26.2 The Construction Administrator is not empowered to revoke, alter, enlarge, or relax any requirements of the Contract Documents, or to issue instructions contrary to the Contract Documents. The Construction Administrator shall in no case act as foreman or perform other duties for the Contractor, nor shall the Construction Administrator interfere with the management of the Work by the Contractor. Any advice, which the Construction Administrator may give the Contractor, shall in no way be construed as binding the Commissioner or Owner in any way, nor releasing the Contractor from the fulfillment of the terms of the Contract.

26.3 In any dispute arising between the Contractor and the Construction Administrator with reference to inspection and rejection of the Work, the Construction Administrator may suspend Work on the non-compliant portion of the Work until the dispute can be referred to and decided by the Commissioner.

ARTICLE 27
SCHEDULE OF VALUES, APPLICATION FOR PAYMENT

27.1 Immediately after the signing of the Contract, the Contractor shall furnish for the use of the Commissioner, as a basis for estimating partial payments, a certified Schedule of Values, totaling the Contract Sum and broken down into quantities and unit costs, as outlined in the Contract Documents and as directed by the Owner. The Schedule of Values must reflect true costs and be in sufficient detail to be an effective tool for monitoring the progress of the Work. Upon request of the Commissioner; the Contractor shall supply copies of signed Contracts, vendor quotations, etc. as back up to the Schedule of Values.

27.2 Approval of the Schedule of Values by the Commissioner is required prior to any payment by the Owner.

27.3 The Schedule of Values shall include a breakdown of the Contractor's general condition costs.

27.3.1 Non-recurring costs, (i.e. Mobilization costs, utility hook-ups, temporary heat) will be paid at the time of occurrence.

27.3.2 Reoccurring costs will be paid in proportion to the percent of completion of the Project.

27.3.3 Further detail can be found in the General Requirements 01.29.76; paragraphs 1.3.B.4 for this project.

27.4 The Schedule of Values shall include a breakdown of Contract closeout costs including systems certification testing and acceptance, training, Warranties, Guarantees, As-Built Drawings and attic stock.

27.5 The Contractor shall make periodic applications for payment, which shall be subdivided into categories corresponding with the approved Schedule of Values and shall be in such numbers of copies as may be designated by the Commissioner.

ARTICLE 28
PARTIAL PAYMENTS

28.1 Commissioner will examine the Contractor's Applications For Payments to determine, in the opinion of the Commissioner, the amounts that properly represent the value of the Work completed and the materials suitably stored on the site.

28.2 In making such Application For Payment for the Work, there shall not be more than **seven and five-tenths percent (7.5%)** deducted from the amount of each Application for Payment to be retained by the Owner as Retainage until Acceptance of the Work.

28.2.1 The following criteria shall be utilized in the reduction of Retainage withheld: At fifty percent (50%) completion of the Work the Retainage shall be reduced to **five percent (5%)**. All subsequent Applications for Payment shall be subject to **five percent (5%)** Retainage. Upon Substantial Completion, and in the Commissioner's sole discretion and based upon the factors set forth in **Section 28.3**, the Retainage may be reduced upon the request of the Contractor and recommendation of the DAS Project Manager. In the event of a reduction in Retainage to **below five percent (5%)**, the minimum Retainage withheld shall not be less than the DAS Project Manager's estimate of the remaining Work or **two and five-tenths percent (2.5%)**, whichever is greater. All requests for Retainage Reduction shall be done on **CT DAS Form 7048 General Contractor Retainage Reduction Request**, a sample of which can be found at the end of these General Conditions.

28.2.2 Subsequent to Substantial Completion, in limited circumstances, at the sole discretion of the Commissioner and based upon factors set forth in Section 28.3, a reduction of Retainage below **two and five-tenths percent (2.5%)** may be considered.

28.2.3 A "Good" Contractor's Performance Evaluation score shall be defined as a minimum total score of sixty percent (60%).

28.3 The decision of the Commissioner to reduce the Retainage rate will be based upon the **Contractor's Performance Evaluation** score for completed portions of the Work as set out above and other factors that the Commissioner may find appropriate as follows:

28.3.1 The Contractor's timely submission of an appropriate and complete CPM Schedule or Construction Schedule and Schedule of Values, in compliance with the Contract requirements and the prompt resolution of the Owner's and/or Architect's or Engineer's comments on the submitted material resulting in an appropriate basis for progress of the Work.

28.3.2 The Contractor's timely and proper submission of all Contract Document required submissions: including, but not limited to, Shop Drawings, material certificates and material samples and the prompt resolution of the Owners and/or Architect's or Engineer's comments on the submitted material, resulting in an appropriate progress of the Work.

28.3.3 The Contractor's provision of proper and adequate supervision and home office support of the Project.

28.3.4 The Work completed to date has been installed or finished in a manner acceptable to the Owner.

28.3.5 The progress of the Work is consistent with the approved CPM Schedule or Construction Schedule.

28.3.6 All approved credit change orders have been invoiced.

28.3.7 All Change Order requests for pricing are current.

28.3.8 The Contractor has and is maintaining a clean worksite in accordance with the Contract Documents.

28.3.9 All Subcontractor payments are current at the time of reduction request.

28.3.10 Contractor is compliant with set-aside provisions of the contract.

28.3.11 Pursuant to C.G.S. Sec. 4a-101, the General Contractor shall compile evaluation information during the performance of the contract on each of its subcontractors who are performing work with a value in excess of five hundred thousand dollars (\$500,000.00). The General Contractor shall complete and submit to the State of Connecticut Department of Construction Services (CT DCS) evaluations of each such subcontractor upon fifty percent (50%) completion of the project and upon Substantial Completion of the project. The General Contractor acknowledges that its failure to complete and submit these evaluations in a timely manner may, by statute; result in a delay in project funding and, consequently, payment to the General Contractor.

28.4 No payments will be made for improperly stored or protected materials or unacceptable Work.

28.5 At his or her sole discretion, the Commissioner may allow to be included in the monthly requisitions payment requests for materials and equipment stored off the site.

28.5.1 In the event the Commissioner allows the Contractor to include in its requisitions payment requests for materials and equipment stored off the site, the Contractor shall also submit any additional bonds and/or insurance certificates relating to off-site stored materials and equipment, and follow such other procedures as may be required by the State to obtain the Commissioner's approval of such requests.

28.5.2 The Architect or Engineer, or Construction Administrator shall have inspected said materials and equipment and recommended payment therefore. The Contractor shall pay for the cost of the Architect's or Engineer's, or Construction Administrator's time and expense in performing these inspection services.

ARTICLE 29
DELIVERY OF STATEMENT SHOWING
AMOUNTS DUE FOR WAGES, MATERIALS, AND SUPPLIES

29.1 For each Application for Payment under this Contract, the Owner reserves the right to require the Contractor and every Subcontractor to submit a written verified statement, in a form satisfactory to the Owner, showing in detail all amounts then due and unpaid by such Contractor or Subcontractor for daily or weekly wages to all laborers employed by it for the performance of the Work or to other persons for materials, equipment or supplies delivered at the site.

29.2 The term "laborers" as used herein shall include workmen, workwomen, and mechanics.

29.3 Failure to comply with this requirement may result in the Owner withholding the Application for Payment pursuant to Article 28.

ARTICLE 30
SUBSTANTIAL COMPLETION AND ACCEPTANCE

30.1 Substantial Completion:

30.1.1 When the Contractor considers that the Work or a portion thereof is Substantially Complete, the Contractor shall request an inspection of said Work in writing to the Construction Administrator. The request shall certify that the Contractor has completed its own inspection prior to the request and that the Contractor is compliant with all requirements of Section 01 77 00 of the General Requirements. The request must also include a statement that a principal or senior executive of the Contractor is ready, willing and able to attend a walk through inspection with the Architect or Engineer.

30.1.2 Upon receipt of the request, the Architect or Engineer, Construction Administrator and Owner, will make an inspection to determine if the Work or designated portion thereof is Substantially Complete. A principal or senior executive of the Contractor shall accompany the Architect or Engineer during each inspection/re-inspection. If the inspection discloses any item, whether or not included on the inspection list, which is not in accordance with the requirements of the Contract Documents, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item.

30.1.3 The Contractor shall then submit a request for another inspection. The determination of Substantial Completion is solely within the discretion of the Owner. Any costs for re-inspection beyond one, shall be at the expense of the Contractor and such costs will be recovered by issuance of a credit Change Order. When the Work or designated portion thereof is determined to be Substantially Complete, the Contractor will be provided a Certificate of Substantial Completion from the Owner. The Certificate of Substantial Completion shall establish the date when the responsibilities of the Contractor for security, maintenance, heat, utilities, damage to the Work, and insurance, are transferred to the Owner and shall fix the time within which the Contractor shall finish all items on the inspection list accompanying the Certificate. If the punch list is not complete in **90 Days**, the Owner reserves the right to complete the outstanding punch list items with their own forces or by awarding separate contracts and to deduct the cost thereof from the amounts remaining due to the Contractor.

30.1.4 The Certificate of Substantial Completion shall be signed by the Construction Administrator, Owner, and Architect or Engineer. Upon Substantial Completion of the Work or designated portion thereof and upon application by the Contractor and certification by the Construction Administrator and Architect or Engineer, the Owner shall make payment reflecting adjustment in Retainage, if any, for such Work or portion thereof as provided in the Contract Documents.

30.2 Acceptance:

30.2.1 Upon completion of the Work, the Contractor shall forward to the Construction Administrator a written notice that the Work is ready for inspection and Acceptance.

30.2.2 When the Work has been completed in accordance with terms and conditions of the Contract Documents as determined by the Owner a Certificate of Acceptance shall be issued by the Owner.

**ARTICLE 31
FINAL PAYMENT**

31.1 The Owner reserves the right to retain for a period of thirty (30) Days after filing of the Certificate of Acceptance the amount therein stated less all prior payments and advances whatsoever to or for the account of the Contractor.

31.2 All prior estimates and payments, including those relating to extra or additional Work, shall be subject to correction by the Final Payment.

31.3 No Application for Payment, Final or Partial, shall act as a release to the Contractor or the Contractor's sureties from any obligations under this Contract.

31.4 The Architect or Engineer and Construction Administrator will promptly issue the Certificate for Payment, stating that to the best of their knowledge, information and belief, and on the basis of their observations and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in said Final Payment is due and payable.

31.5 Final Payment shall not be released until a Certificate of Acceptance and a Certificate of Compliance have been issued.

31.6 Neither Final Payment nor any Retainage shall become due until the Contractor submits to the Owner the following:

31.6.1 An affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied.

31.6.2 A certificate evidencing that insurance required by the Contract Documents to remain in force after Final Payment is currently in effect and will not be canceled or allowed to expire without at least 30 Days prior written notice to the Owner.

31.6.3 A written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents.

31.6.4 Written consent of surety, if any, to Final Payment.

31.6.5 If required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorney's fees.

ARTICLE 32
OWNER'S RIGHT TO WITHHOLD PAYMENTS

32.1 The Commissioner may withhold a portion of any Payment due the Contractor that may, in the judgment of the Commissioner, be necessary:

32.1.1 To assure the payment of just claims then due and unpaid to any persons supplying labor or materials for the Work.

32.1.2 To protect Owner from loss due to defective, unacceptable or non-conforming Work not remedied by the Contractor.

32.1.3 To protect the Owner from loss due to injury to persons or damage to the Work or property of other Contractors, Subcontractors, or others caused by the act or neglect of the Contractor or any of its Subcontractors.

32.2 The Owner shall have the right to apply any amount withheld under this Article as the Owner may deem proper to satisfy protection from claims. The amount withheld shall be considered a payment to the Contractor.

32.3 The Owner has the right to withhold payment if the Contractor fails to provide accurate submissions of Submittals, up date the status including but not limited to the following: As-Built Drawings, request for information (RFI) log, Schedule, submittal log, Change Order log, certified payrolls and daily reports and all other requirement of the Contract Documents.

32.4 If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorney's fees.

ARTICLE 33
OWNER'S RIGHT TO STOP WORK OR TERMINATE CONTRACT

33.1 The Commissioner shall have the authority to suspend the Work wholly or in part, for such period or periods as the Commissioner considers being in the best interests of the State, or in the interests of public necessity, convenience or safety. During such periods the Contractor shall store all materials and equipment, in such a manner to prevent the materials and equipment from being damaged in any way, and the Contractor shall take precautions to protect the Work from damage.

33.1.1 If the Commissioner, in writing, orders the performance of all or any portion of the Work to be suspended or delayed for an unreasonable period of time (i.e. not originally anticipated, customary, or inherent in the construction industry) and the Contractor believes that additional compensation and/or Contract Time is due as a result of such suspension or delay, the Contractor shall submit to the Commissioner in writing a request for a Contract adjustment within 7 Days of receipt of the notice to resume Work. The request shall set forth the specific reasons and support for said adjustment.

33.1.2 The Commissioner shall evaluate any such requests received. If the Commissioner agrees that the cost and/or time required for the performance of the Contract has increased as a result of such suspension and that the suspension was caused by conditions beyond the control of and not the fault of the Contractor, its suppliers, or Subcontractors, and was not caused by weather, then the Commissioner will make a reasonable adjustment, excluding profit, of the Contract terms. The Commissioner will notify the Contractor of the determination as to what adjustments of the Contract, if any, that the Commissioner deems warranted.

33.1.3 No Contract adjustment will be made unless the Contractor has submitted the request for adjustment within the time prescribed.

33.1.4 No Contract adjustment will be made under this Article to the extent that performance would have been suspended or delayed by any other cause within the Contractor's control or by any factor for which the Contractor is responsible under the Contract; or that such an adjustment is provided for or excluded under other term or condition of this Contract.

33.2 Termination for Convenience: Notwithstanding any provision or language in the Contract to the contrary, the State may terminate the Contract for convenience whenever the Commissioner determines at his sole discretion that such termination is in the best interests of the State. Any such termination shall be effected by delivery to the Contractor of a written Notice of Termination for Convenience specifying the extent to which performance of Work under the Contract is terminated, and the date upon which such termination shall be effective.

33.2.1 In the event of such termination, the Contractor shall be entitled to reasonable compensation as determined by the Commissioner, however, no claim for lost Overhead or Profits shall be allowed.

33.2.2 All Work and materials obtained by the Contractor for the Work, that have been incorporated into the Work, inspected, tested as required, accepted by the Commissioner, and paid for by the State, shall become the property of the State.

33.2.3 Materials obtained by the Contractor for the Work that have been inspected, tested as required, and accepted by the Commissioner, and that are not incorporated into the Work, shall, at the option of the Commissioner, be purchased from the Contractor at actual cost as shown by receipted bills. To this cost shall be added all actual costs for delivery at such points of delivery as may be designated by the Commissioner, as shown by actual cost records.

33.2.4 Termination of the Contract for convenience shall not relieve the Contractor or its surety of their responsibilities for the completed Work, nor shall it relieve the Contractor's surety of its obligations to ensure completion of the Work and to pay legitimate claims arising out of the Work.

33.3 Termination for Cause:

33.3.1 The Commissioner may give notice in writing to the Contractor and its surety of any particular delay, neglect, or default of the Contractor due to one or more of the following:

33.3.1.1 Failure to begin the Work within the time specified for same in the Contract Documents.

33.3.1.2 Failure to perform the Work with sufficient workmen, equipment or materials to ensure the prompt completion of the Work within the time specified in the Contract.

33.3.1.3 Unsuitable performance of the Work or failure to remedy or redo such work as DAS Project Manager shall reject as defective, unsuitable, or noncompliant with Contract requirements.

33.3.1.4 Failure or refusal to remove material rejected as defective, unsuitable, or noncompliant with Contract requirements.

33.3.1.5 Discontinuance of the suitable prosecution of the Work for a period of seventy-two (72) hours, excluding Saturdays, Sundays and holidays, without written authorization to do so from the DAS Project Manager.

33.3.1.6 Failure to recommence discontinued Work within forty-eight (48) hours (excluding Saturdays, Sundays and holidays) after being ordered to do so by the DAS Project Manager.

33.3.1.7 Insolvency, filing for bankruptcy or any act or occurrence that may render the Contractor financially incapable of completing the Work.

33.3.1.8 Failure to satisfy any final judgment against it for a period of thirty (30) days.

33.3.1.9 Making of any assignment for the benefit of creditors.

33.3.1.10 Violation of any provisions of the Contract Documents.

33.3.2 If the Contractor or its surety within a period of ten (10) days after the issuance of such notice does not proceed in conformance with the directions set forth therein, or fails to present a remedial plan of operation, satisfactory to the Commissioner, for remedying the acts or failures complained of in the notice, then the Commissioner may, at his discretion, order the surety to complete the Work or, without violating the Contract, take the right to control and prosecute the Work out of the hands of said Contractor and surety, terminating the Contract.

33.3.3 The Commissioner may appropriate or use any or all stockpiled materials and any and all equipment required by the Contract as may be suitable and necessary for completion of the Work and may enter into an agreement, either by negotiation or public letting, for the completion of said Contract by a party other than the Contractor, according to the terms and provisions thereof, or use such other methods or combinations thereof as in his or her opinion shall be required or desirable for the completion of the Work.

33.3.4 All costs and charges incurred by the Owner in connection with completing the Work, or as a result of the Contractor's default, shall be deducted from any monies due to or which may become due to the Contractor. In case such expense exceeds the sum that would have been payable under the Contract, then the Contractor and the surety shall be liable for, and shall pay to the State, the amount of the excess. Termination of the Contract shall not relieve the Contractor or its surety of their responsibilities for the completed Work, nor shall it relieve the Contractor's surety of its obligations to ensure completion of the Work and to pay legitimate claims arising out of the Work.

ARTICLE 34
SUBLETTING OR ASSIGNING OF CONTRACT

34.1 The Contract or any portion thereof, or the Work provided for therein, or the right, title, or interest of the Contractor therein may not be sublet, sold, transferred, assigned, or otherwise disposed of to any person, firm, or corporation without the written consent of the Commissioner.

34.2 No person, firm, or corporation other than the Contractor to whom the Contract was awarded shall be permitted to commence Work at the site of the Contract until such consent has been granted.

ARTICLE 35
CONTRACTOR'S INSURANCE

35.1 The Contractor shall not start Work under the Contract until they have obtained insurance as stated in SECTIONS 00 62 16 CERTIFICATE OF INSURANCE and 00 41 00 BID PROPOSAL FORM of the Project Manual and until the insurance has been approved by the Owner. The Contractor shall not allow any Subcontractor to start Work until the same insurance has been obtained by the Subcontractor and approved by the Owner or the Contractor's insurance provides coverage on behalf of the Subcontractor. The Contractor shall send Certificates of Liability Insurance to the Connecticut Department of Administrative Services/Construction Services, Office of Legal Affairs, Policy and Procurement, 450 Columbus Blvd, Suite 1302, Hartford, CT 06103-1835 unless otherwise directed in writing. For insurance definitions see Article 1 herein. Presented below is a narrative summary of the insurance required.

35.1.1 Commercial General Liability Insurance: Insurance including contractual liability, products/completed operations, broad form property damage and independent Contractors. The limits shall be no less than \$1,000,000 each occurrence and \$2,000,000 annual aggregate. Coverage for hazards of explosion, collapse and underground (X-C-U) and for asbestos abatement when applicable to this Contract, must also be included when applicable to the Work to be performed. The State of Connecticut, the Department of Administrative Services, and their respective officers, agents, and employees shall be named as an Additional Insured. This coverage shall be provided on a primary basis.

35.1.2 Owner's and Contractor's Protective Liability Insurance: Insurance providing a total limit of \$1,000,000 for all damages arising out of bodily injury or death of persons in any one accident or occurrence and for all damages arising out of injury or destruction of property in any one accident or occurrence and subject to a total (aggregate) limit of \$2,000,000 for all damages arising out of bodily injury to or death of persons in all accidents or occurrences and out of injury to or destruction of property during the policy period. This coverage shall be for and in the name of the State of Connecticut.

35.1.3 Automobile Liability Insurance: The operation of all motor vehicles including those owned, non-owned and hired or used in connection with the Contract shall be covered by Automobile Liability Insurance providing for a total limit of \$1,000,000 for all damages arising out of bodily injuries to or death of all persons in any one accident or occurrence and for all damages arising out of injury to or destruction of property in any one accident or occurrence. In cases where an insurance policy shows an aggregate limit as part of the automobile liability coverage, the aggregate limit must be at least \$2,000,000. This coverage shall be provided on a primary basis. Should the Contractor not own any automobiles, the automobile & liability requirement shall be amended to allow the Contractor to maintain only hired and non-owned liability coverage.

35.1.4 Umbrella Liability Insurance: Umbrella Liability Insurance, including a drop down provision covering any exhausted underlying aggregate limits in the specified amount shown below of combined single limit each occurrence in excess of the coverages described in subsections 35.1.1 Commercial General Liability Insurance, 35.1.3 Automobile Liability, and 35.1.5 Workers' Compensation and Employer's Liability. The State of Connecticut shall be named as an additional insured. The Umbrella Liability Insurance Limits for the Contractor are based on the Contract Value as specified in the following table.

| Umbrella Liability Insurance Table: | | | |
|--|----|----------------|-----------------------|
| Contract Value | | | Umbrella Limit |
| \$1.00 | to | \$500,000.00 | \$1,000,000.00 |
| \$500,000.01 | to | \$1,000,000.00 | \$2,000,000.00 |
| \$1,000,000.01 | to | \$10,000,000 | \$5,000,000.00 |
| \$10,000,000.01 | to | \$30,000,000 | \$10,000,000.00 |
| \$30,000,000.01 | to | \$80,000,000 | \$15,000,000.00 |
| \$80,000,000.01 | to | \$150,000,000 | \$20,000,000.00 |
| \$150,000,000.01 | to | \$300,000,000 | \$25,000,000.00 |

35.1.5 Workers' Compensation and Employer's Liability: As required by Connecticut Law and **Employers' Liability** with a limit of not less than \$100,000 per occurrence, \$500,000 disease policy limit and \$100,000 disease each employee. When Work is on or contiguous to navigable bodies of waterways and ways adjoining, the Contractor shall include the Federal Act endorsement for the U.S. Longshoremens and Harbor Workers Act.

35.1.6 Special Hazards Insurance: If required, will be stated in the BID PROPOSAL FORM of this Project Manual. This includes coverage for explosion, collapse or underground damage and for asbestos abatement when applicable to this Contract and shall be no less than \$1,000,000 each occurrence.

35.1.7 Builder's Risk Insurance: If required, will be stated in the BID PROPOSAL FORM of this Project Manual.

35.1.8 Inland Marine/Transit Insurance: With respect to property with values in excess of \$100,000 which is rigged, hauled or situated at the site pending installation, the Contractor shall maintain inland marine/transit insurance provided the coverage is not afforded by a Builder's Risk policy.

35.1.9 When required to be maintained, the Builder's Risk and/or Inland Marine/Transit Insurance policy shall endorse the State of Connecticut as a Loss Payee and the policy shall state it is for the benefit of and payable to the State of Connecticut.

35.2 Satisfying Limits Under an Umbrella Policy: If necessary, the Contractor may satisfy the minimum limits required above for either Commercial General Liability, Automobile Liability, and Employer's Liability coverage under an Umbrella or Excess Liability policy. The underlying limits may be set at the minimum amounts required by the Umbrella or Excess Liability policy provided the combined limits meet at least the minimum limit for each required policy. The Umbrella or Excess Liability policy shall have an Annual Aggregate at a limit not less than two (2) times the highest per occurrence minimum limit required above for any of the required coverages. The State of Connecticut shall be specifically endorsed as an Additional Insured on the Umbrella or Excess Liability policy, unless the Umbrella or Excess Liability policy provides continuous coverage to the underlying policies on a complete "Follow-Form" basis.

35.3 The Contractor shall, at its sole expense, maintain in full force and effect at all times during the life of the Contract or the performance of Work hereunder, insurance coverage as described herein. Certificates shall include a minimum thirty (30)-day endeavor to notify requirement to the Owner prior to any cancellation or non-renewal.

35.4 The Contractor shall be fully and solely responsible for any costs or expenses as a result of a coverage deductible, coinsurance penalty, or self-insured retention, including any loss not covered because of the operation of such deductible, coinsurance penalty, or self-insured retention.

35.5 The requirement contained herein as to types and limits of insurance coverage to be maintained by the Contractor are not intended to and shall not in any manner limit or qualify the liabilities and obligations assumed by the Contractor.

35.6 Indemnification and Hold Harmless Provisions:

35.6.1 The Contractor shall indemnify, defend and hold harmless the State and its officers, representatives, agents, servants, employees, successors and assigns from and against any and all (1) Claims arising, directly or indirectly, in connection with the Contract, including the acts of commission or omission (collectively, the "Acts") of the Contractor or Contractor Parties; and (2) liabilities, damages, losses, costs and expenses, including but not limited to, attorneys' and other professionals' fees, arising, directly or indirectly, in connection with Claims, Acts or the Contract. The Contractor shall use counsel reasonably acceptable to the State in carrying out its obligations under this section. The Contractor's obligations under this section to indemnify, defend and hold harmless against Claims includes Claims concerning confidentiality of any part of or all of the Contractor's bid, proposal or any Records, any intellectual property rights, other proprietary rights of any person or entity, copyrighted or uncopyrighted compositions, secret processes, patented or unpatented inventions, articles or appliances furnished or used in the Performance.

35.6.2 The Contractor shall not be responsible for indemnifying or holding the State harmless from any liability arising due to the negligence of the State or any third party acting under the direct control or supervision of the State.

35.6.3 The Contractor shall reimburse the State for any and all damages to the real or personal property of the State caused by the Acts of the Contractor or any Contractor Parties. The State shall give the Contractor reasonable notice of any such Claims.

35.6.4 The Contractor's duties under this section shall remain fully in effect and binding in accordance with the terms and conditions of the Contract, without being lessened or compromised in any way, even where the Contractor is alleged or is found to have merely contributed in part to the Acts giving rise to the Claims and/or where the State is alleged or is found to have contributed to the Acts giving rise to the Claims.

35.6.5 The Contractor shall carry and maintain at all times during the term of the Contract, and during the time that any provisions survive the term of the Contract, sufficient general liability insurance to satisfy its obligations under this Contract. The Contractor shall name the State as an additional insured on the policy and shall provide a copy of the policy to the Agency prior to the effective date of the Contract. The Contractor shall not begin Performance until the delivery of the policy to the Agency. The Agency shall be entitled to recover under the insurance policy even if a body of competent jurisdiction determines that the Agency or the State is contributorily negligent.

35.6.6 Such obligations shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to any party or person described in General Conditions Article 35.

35.6.7 This section shall survive the Termination of the Contract and shall not be limited by reason of any insurance coverage.

ARTICLE 36
FOREIGN MATERIALS

36.1 Preference shall be given to articles or materials manufactured or produced in the United States, Canada, and Mexico, (the members of the North American Free Trade Agreement (NAFTA)); and the products shall meet all of the referenced standards and Specifications for conditions of performance, quality, and price with duty being equal.

36.2 Only articles or materials manufactured or produced in the United States, Canada, and Mexico, (the members of the North American Free Trade Agreement (NAFTA)), will be allowed. The foregoing provisions shall not apply to foreign articles or materials required by the Contract Documents.

36.3 Buy American Act (BAA): Any "public building" or "public work" project funded by the American Recovery and Reinvestment Act of 2009 ("ARRA") requires that "all of the iron, steel, and manufactured goods used in the project" must be "produced in the United States" in accordance with the requirements of the Buy American Act (BAA).

ARTICLE 37
HOURS OF WORK

37.1 No person shall be employed to work or be permitted to work more than eight (8) hours in any Day or more than forty (40) hours in any week for any Work provided in the Contract, in accordance with Connecticut General Statute Section 31-57.

37.2 The operation of such limitation of hours of work may be suspended during an emergency, upon the approval of the Commissioner, in accordance with Connecticut General Statute Section 31-57.

ARTICLE 38
CLAIMS

38.1 General: When filing a formal claim under Section 4-61 (referred to as "Section 4-61" below) of the Connecticut General Statutes (as revised), either as a lawsuit in the Superior Court or as a demand for arbitration, the Contractor must follow the procedures and comply with the requirements set forth in this Article. This Section does not, unless so specified, govern informal claims for additional compensation which the Contractor may bring before the Department. The Contractor should understand, however, that the Department may need, before the Department can resolve such a claim, the same kinds of documentation and other substantiation that it requires under this Article. It is the intent of the Department to compensate the Contractor for actual increased costs caused by or arising from acts or omissions on the part of the Department that violate legal or contractual duties owed to the Contractor by the Department.

38.2 Notice of Claim: Whenever the Contractor intends to file a formal claim against the Department under Section 4-61, seeking compensation for additional costs, the Contractor shall notify the Commissioner in writing (in strict compliance with Section 4-61) of the details of said claim. Such written notice shall contain all pertinent information described in Paragraph 38.5 below. Once formal notice of a claim under Section 4-61(b) (as revised) has been given to the Commissioner, the claimant may not change the claim in any way, in either concept or monetary amount, (1) without filing a new notice of claim and demand for arbitration to reflect any such change, and (2) without the minimum period of six months after filing of the new demand commencing again and running before any hearing on the merits of the claim may be held. The only exception to this limitation will be for damages that continue to accrue after submission of the notice, in ways described and anticipated in the notice.

38.3 Record Keeping: The Contractor shall keep daily records of all costs incurred in connection with its Work on behalf of the Department. The daily records shall identify each aspect of the Project affected by matters related to any claim for additional compensation that the Contractor has filed, intends to file, or has reason to believe that it may file against the Department; the specific Project locations where Project work has been so affected; the number of people working on the affected aspects of the Project at the pertinent time(s); and the types and number of pieces of equipment on the Project site at the pertinent time(s). Any potential or anticipated effect on the Project's progress or Schedule which may result in a claim by the Contractor shall be noted contemporaneously with the cause of the effect, or as soon thereafter as possible.

38.4 Claim Compensation: The payment of any claim, or any portion thereof, that is deemed valid by the Department shall be made in accordance with the following provisions of this Article:

38.4.1 Compensable Items: The liability of the Department for claims will be limited to the following specifically identified items of cost, insofar as they have not otherwise been paid for by the Department, and insofar as they were caused solely by the actions or omissions of the Department or its agents (except that with regard to payment for extra work, the Department will pay to the Contractor the Overhead and profit percentages provided for in Article 13.):

38.4.1.1 Additional Project-site labor expenses.

38.4.1.2 Additional costs for materials.

38.4.1.3 Additional, unabsorbed Project-site Overhead (e.g., for mobilization and demobilization).

38.4.1.4 Additional costs for active equipment.

38.4.1.5 For each Day of Project delay or suspension caused solely by actions or omissions of the Department either:

38.4.1.5.1 an additional ten percent (10%) of the total amount of the costs identified in Subparagraphs 38.4.1.1 through 38.4.1.4 above; except that if the delay or suspension period prevented the Contractor from incurring enough Project costs under Subparagraphs 38.4.1.1 through 38.4.1.4 during that period to require a payment by the Department that would be greater than the payment described in Subparagraph 38.4.1.5.2 below, then the payment for affected home office Overhead and profit shall instead be made in the following *per diem* amount:

38.4.1.5.2 six percent (6%) of the original total Contract amount divided by the original number of Days of Contract Time. Payment under either 38.4.1.5.1 or 38.4.1.5.2 hereof shall be deemed to be complete and mutually satisfactory compensation for any unabsorbed home office overhead and any profit related to the period of delay or suspension.

38.4.1.6 Additional equipment costs. Only actual equipment costs shall be used in the calculation of any compensation to be made in response to claims for additional Project compensation. Actual equipment costs shall be based upon records kept in the normal course of business and in accordance with generally accepted accounting principles. Under no circumstances shall Blue Book or other guide or rental rates be used for this purpose (unless the Contractor had to rent the equipment from an unrelated party, in which case the actual rental charges paid by the Contractor, so long as they are reasonable, shall be used). Idle equipment, for instance, shall be paid for based only on its actual cost to the Contractor.

38.4.1.7 Subcontractor costs limited to, and determined in accordance with, Subparagraphs 38.4.1.1 through 38.4.1.5 above and applicable statutory and case law. Such Subcontractor costs may be paid for by the Department only: (a) in the context of an informal claims settlement; or (b) if the Contractor has itself paid or legally assumed, present unconditional liability for those Subcontractor costs.

38.4.2 Excusable But Not Compensable Items: The Contractor may be allowed Days but the Department will have no liability for the following non-compensable items:

38.4.2.1 Abnormal or unusually severe weather

38.4.2.2 Acts of God

38.4.2.3 Force Majeure

38.4.2.4 Concurrent Delay

38.4.3 Non-Compensable Items: The Department will have no liability for the following specifically-identified non-compensable items:

38.4.3.1 Profit, in excess of that provided for herein.

38.4.3.2 Loss of anticipated profit.

38.4.3.3 Loss of bidding opportunities.

38.4.3.4 Reduction of bidding capacity.

38.4.3.5 Home office overhead in excess of that provided for in Subparagraph 38.4.1.5 hereof.

38.4.3.6 Attorneys fees, claims preparation expenses, or other costs of claims proceedings or resolution.

38.4.3.7 Subcontractor failure to perform

38.4.3.8 Any other consequential or indirect expenses or costs, such as tort damages, or any other form of expense or damages not provided for in these specifications or elsewhere in the Contract.

38.5 Required Claim Documentation: All claims shall be submitted in writing to the Commissioner, and shall be sufficient in detail to enable the Department to ascertain the basis and the amount of each claim, and to investigate and evaluate each claim in detail. As a minimum, the Contractor must provide the following information for each and every claim and sub-claim asserted:

38.5.1 A detailed factual statement of the claim, with all dates, locations and items of Work pertinent to the claim.

38.5.2 A statement of whether each requested additional amount of compensation or extension of time is based on provisions of the Contract or on an alleged breach of the Contract. Each supporting or breached Contract provision and a statement of the reasons why each such provision supports the claim must be specifically identified or explained.

38.5.3 Excerpts from manuals or other texts which are standard in the industry, if available, that support the Contractor's claim.

38.5.4 The details of the circumstances that gave rise to the claim.

38.5.5 The date(s) on which any and all events resulting in the claim occurred, and the date(s) on which conditions resulting in the claim first became evident to the Contractor.

38.5.6 Specific identification of any pertinent document, and detailed description of the substance of any material oral communication, relating to the substance of such claim.

38.5.7 If an extension of time is sought, the specific dates and number of Days for which it is sought, and the basis or bases for the extension sought. A critical path method, bar chart, or other type of graphical schedule that supports the extension must be submitted.

38.5.8 When submitting any claim over \$50,000, the Contractor shall certify in writing, under oath and in accordance with the formalities required by the contract, as to the following:

38.5.8.1 That supporting data is accurate and complete to the Contractor's best knowledge and belief;

38.5.8.2 That the amount of the dispute and the dispute itself accurately reflects what the Contractor in good faith believes to be the Department's liability;

38.5.8.3 The certification shall be executed by:

38.5.8.3.1 If the Contractor is an individual, the certification shall be executed by that individual.

38.5.8.3.2 If the Contractor is not an individual, the certification shall be executed by a senior company official in charge at the Contractor's plant or location involved or an officer or general partner of the Contractor having overall responsibility for the conduct of the Contractor's affairs.

38.6 Auditing of Claims: All claims filed against the Department shall be subject to audit by the Department or its agents at any time following the filing of such claim. The Contractor and its Subcontractors and suppliers shall cooperate fully with the Department's auditors. Failure of the Contractor, its Subcontractors, or its suppliers to maintain and retain sufficient records to allow the Department or its agents to fully evaluate the claim shall constitute a waiver of any portion of such claim that cannot be verified by specific, adequate, contemporaneous records, and shall bar recovery on any claim or any portion of a claim for which such verification is not produced. Without limiting the foregoing requirements, and as a minimum, the Contractor shall make available to the Department and its agents the following documents in connection with any claim that the Contractor submits:

38.6.1 Daily time sheets and foreman's daily reports.

38.6.2 Union agreements, if any.

38.6.3 Insurance, welfare, and benefits records.

38.6.4 Payroll register.

38.6.5 Earnings records.

38.6.6 Payroll tax returns.

38.6.7 Records of property tax payments.

38.6.8 Material invoices, purchase orders, and all material and supply acquisition contracts.

38.6.9 Materials cost distribution worksheets.

38.6.10 Equipment records (list of company equipment, rates, etc.).

38.6.11 Vendor rental agreements.

38.6.12 Subcontractor invoices to the Contractor, and the Contractor's certificates of payments to Subcontractors.

38.6.13 Subcontractor payment certificates.

38.6.14 Canceled checks (payroll and vendors).

38.6.15 Job cost reports.

38.6.16 Job payroll ledger.

38.6.17 General ledger, general journal (if used), and all subsidiary ledgers and journals, together with all supporting documentation pertinent to entries made in these ledgers and journals.

38.6.18 Cash disbursements journals.

38.6.19 Financial statements for all years reflecting the operations on the Project.

38.6.20 Income tax returns for all years reflecting the operations on the Project.

38.6.21 Depreciation records on all company equipment, whether such records are maintained by the company involved, its accountant, or others.

38.6.22 If a source other than depreciation records is used to develop costs for the Contractor's internal purposes in establishing the actual cost of owning and operating equipment, all such other source documents.

38.6.23 All documents which reflect the Contractor's actual profit and overhead during the years that the Project was being performed, and for each of the five years prior to the commencement of the Project.

38.6.24 All documents related to the preparation of the Contractor's bid, including the final calculations on which the total proposed Contract bid price as stated in the Bid Proposal Form was based.

38.6.25 All documents which relate to the claim or to any sub-claim, together with all documents that support the amount of damages as to each claim or sub-claim.

38.6.26 Worksheets used to prepare the claim, which indicate the cost components of each item of the claim, including but not limited to the pertinent costs of labor, benefits and insurance, materials, equipment, and Subcontractors' damages, as well as all documents which establish the relevant time periods, individuals involved, and the Project hours and the rates for the individuals.

38.6.27 The name, function, and pertinent activity of each Contractor's or Subcontractor's official, or employee, involved in or knowledgeable about events that give rise to, or facts that relate to, the claim.

38.6.28 The amount(s) of additional compensation sought and a break-down of the amount(s) into the categories specified as payable under Paragraph 38.4 above.

38.6.29 The name, function, and pertinent activity of each Department official, employee, or agent involved in or knowledgeable about events that give rise to, or facts that relate to, the claim.

ARTICLE 39 **DIESEL VEHICLE EMISSIONS CONTROL**

39.1 The Contractor shall be responsible for compliance with the following provisions:

39.1.1 All Contractor and Subcontractor diesel powered non-road construction equipment with engine horsepower (HP) ratings of 60 HP and above, that are on the Project or are assigned to the Contract for a period in excess of 30 consecutive Days, shall be retrofitted with emission control devices in order to reduce diesel emissions. In addition, all motor vehicles and/or construction equipment (both on-highway and non-road) shall comply with all pertinent State and Federal regulations relative to exhaust emission controls and safety.

39.1.2 Retrofit emission control devices shall consist of oxidation catalysts, or similar retrofit equipment control technology that is:

39.1.2.1 Included on the U.S. Environmental Protection Agency (EPA) "Verified Technology List," as may be amended from time to time <http://www.epa.gov/otaq/retrofit/retroverifiedlist.htm> and

39.1.2.2 Verified by EPA to provide a minimum emissions reduction of 20% particulate matter (PM₁₀), 40% carbon monoxide (CO), and 50% hydrocarbons (HC).

39.1.3 Construction shall not proceed until all diesel powered non-road construction equipment meeting the criteria in provision 39.1.1 have been retrofitted, unless the Commissioner grants a waiver under provision 39.2.

39.1.4 The Contractor shall at least monthly, assess which diesel powered non-road construction equipment are subject to these provisions. The Contractor shall notify the CT DCS Project Manager of any violations of these provisions.

39.1.5 Idling of delivery and/or dump trucks, or other diesel powered equipment shall be limited to three (3) minutes during non-active use in accordance with the Regulations of Connecticut State Agencies Section 22a-74-18(b)(3)(C), which states, in part:

"[N]o person shall cause or allow a Mobile Source to operate for more than three (3) consecutive minutes when such Mobile Source is not in motion, except as follows:

- *When a Mobile Source is forced to remain motionless because of traffic conditions or mechanical difficulties over which the operator has no control,*
- *When it is necessary to operate defrosting, heating or cooling equipment to ensure the safety or health of the driver or passengers,*
- *When it is necessary to operate auxiliary equipment that is located in or on the Mobile Source to accomplish the intended use of the Mobile Source, (To bring the Mobile Source to the manufacturer's recommended)*
- *When a Mobile Source is in queue to be inspected by U.S. military personnel prior to gaining access to a U.S. military installation."*

39.1.6 All Work shall be conducted to ensure that no harmful effects are caused to adjacent Sensitive Receptor Sites. Diesel powered engines shall be located away from fresh air intakes, air conditioners, and windows.

39.1.7 If any diesel powered non-road construction equipment is found to be in non-compliance with these provisions by the CT DCS Project Manager, the Contractor will be issued a Non-Conformance Notice and given a 24 hour period in which to bring the equipment into compliance or remove it from the Project. The Contractor's failure to comply with these provisions shall be reason to withhold payment as described in Article 33.

39.1.8 Any costs associated with these provisions shall be included in the general cost of the contract. In addition, there shall be no time granted to the Contractor for compliance with these provisions. The Contractor's compliance with these provisions and any associated regulations shall not be grounds for a Change Order.

39.2 The Commissioner reserves the right to waive all or portions of these provisions at his/her discretion. The Contractor may request a waiver to all or portions of these provisions with written justification to the Commissioner as to why the Contractor cannot comply with these provisions. A waiver, to be effective, must be granted in writing by the Commissioner.

ARTICLE 40 **DISCLOSURE OF RECORDS**

40.1 This Contract may be subject to the provisions of C.G.S. Section 1-218. In accordance with this statute, each contract in excess of two million five hundred thousand dollars (\$2,500,000.00) between a public agency and a person for the performance of a governmental function shall (a) provide that the public agency is entitled to receive a copy of records and files related to the performance of the governmental function, and (b) indicate that such records and files are subject to the Freedom of Information Act (FOIA) and may be disclosed by the public agency pursuant to FOIA. No request to inspect or copy such records or files shall be valid unless the request is made to the public agency in accordance with FOIA. Any complaint by a person who is denied the right to inspect or copy such records or files shall be brought to the Freedom of Information Commission in accordance with the provisions of C.G.S. Sections 1-205 and 1-206.

ARTICLE 41 **AUDIT AND INSPECTION OF PLANTS, PLACES OF BUSINESS, AND RECORDS**

41.1 The State and its agents, including, but not limited to, the Connecticut Auditors of Public Accounts, Attorney General and State's Attorney and their respective agents, may, at reasonable hours, inspect and examine all of the parts of the Contractor's and Contractor Parties' plants and places of business which, in any way, are related to, or involved in, the performance of this Contract.

41.2 The Contractor shall maintain, and shall require each of the Contractor Parties to maintain, accurate and complete Records. The Contractor shall make all of its and the Contractor Parties' Records available at all reasonable hours for audit and inspection by the State and its agents.

41.3 The State shall make all requests for any audit or inspection in writing and shall provide the Contractor with at least twenty-four (24) hours' notice prior to the requested audit and inspection date. If the State suspects fraud or other abuse, or in the event of an emergency, the State is not obligated to provide any prior notice.

41.4 All audits and inspections shall be at the State's expense.

41.5 The Contractor shall keep and preserve or cause to be kept and preserved all of its and Contractor Parties' Records until three (3) years after the latter of (i) final payment under this Agreement, or (ii) the expiration or earlier termination of this Agreement, as the same may be modified for any reason. The State may request an audit or inspection at any time during this period. If any Claim or audit is started before the expiration of this period, the Contractor shall retain or cause to be retained all Records until all Claims or audit findings have been resolved.


41.6 The Contractor shall cooperate fully with the State and its agents in connection with an audit or inspection. Following any audit or inspection, the State may conduct and the Contractor shall cooperate with an exit conference.

41.7 The Contractor shall incorporate this entire Section verbatim into any contract or other agreement that it enters into with any Contractor Party.

END

Appendix 1

7048
General Contractor (GC)
Retainage Reduction Request
Page 1 of 1



To: Department of Administrative Services (DAS) Construction Services
Office of Legal Affairs, Policy and Procurement
450 Columbus Blvd, Suite 1302 – North Tower
Hartford, CT 06103

From: General Contractor (GC)

Subject: DAS Project Number:
DAS Project Name:
Reduction of Retainage at: Percent (%) Project Completion

Date:

In accordance with the General Conditions, Article 28 Progress Payments,

hereby requests a reduction of retainage from % to %
The following list of items required under the General Conditions is in compliance with the terms of the contract and has been verified by the General Contractor (GC).

- DAS Construction Services Contractor Performance Evaluation Score is a minimum of **(60%) Percent**.
- Timely submission of an appropriate and complete CPM Schedule of Values, in compliance with the Contract requirements and the prompt resolution of the Owner's and/or A/E's comments on the submitted material resulting in an appropriate basis for progress of the Work.
- Timely and proper submission of all required Contract Documents including but not limited to Shop Drawings, material certificates, material samples and the prompt resolution of the Owner's and/or A/E's comments on the submitted material resulting in an appropriate progress of the Work.
- Proper and adequate supervision and office support of the Project.
- The Work completed to date has been installed or finished in a manner acceptable to the Owner.
- The progress of the Work is consistent with the approved CPM Schedule.
- All approved change orders have been invoiced.
- All Change Order requests for materials are current.
- The Contractor is maintaining a clean worksite in accordance with the Contract Documents.
- All Subcontractor payments are current at the time of reduction request.
- GC is compliant with separate provisions of the contract.

General Contractor Certification:

Project Manager Recommendation:

ADPM Approval:

DAS Chief Architect or Authorized Representative:

END

Set-Aside Contractor Schedule [SAMPLE ONLY]

VIA EMAIL

Contractor Name
Contractor Address
City, State, Zip Code

BID OPENING DATE

Re: DAS Project Description
DAS Project Number

Date:

Dear Contractor:

Section 00 45 17 Named Subcontractor Bidders Qualification Statement(s) is / (are) required for this project, only for your Named Subcontractors listed in Table 2.7 of your Section 00 41 00 Bid Proposal Form.

No person whose subcontract *exceeds* five hundred thousand dollars in value may perform work as a subcontractor on a project, which project is estimated to cost more than five hundred thousand dollars and is paid for, in whole or in part, with state funds, *unless, at the time of bid submission*, the person is prequalified in accordance with the Connecticut General Statutes Section 4a-100, as amended. This includes the contractor's or substantial subcontractor's prequalification classifications, aggregate work capacity ratings and single project limits.

In accordance with **Subsection 2.8 "Set-Aside Requirements" of Section 00 21 13 Instructions to Bidders**, you are required to *list* in **Table 1** on the next page the names of each *currently certified set-aside contractor* to be used for this project, along with the dollar *amount* to be paid each set-aside contractor.

The **responsibility** for listing a qualified and certified set-aside contractor rests solely with the **bidder** and not the State. **Listing a set-aside contractor who does not qualify may be considered the same as not listing one at all and the bid may be considered non-responsive and subject to rejection.**

ATTACHMENTS:

For Each of the Named Subcontractors from Table 2.7 of your Bid Proposal Form:

- **Attach their Section 00 45 17 Named Subcontractor Bidders Qualification Statement(s)**

For Each of the Named Set-Aside SBE/MBE Contractors in Table 1 of this Set-Aside Contractor Schedule Request:

- **Attach their DAS Set-Aside Certificate of Eligibility (SBE and/or MBE)**

For Each of the Named Subcontractors from Table 2.7 of your Bid Proposal Form With Subcontracts Greater Than \$500,000:

- **Attach their DAS Prequalification Certificate and Update (Bid) Statement for the Class of Work, to the extent the Class of Work is a Prequalification Classification.**

Contractor Authorized Signature & Title _____ Date
This Form Must Be Received No Later Than _____ At:

State of Connecticut
Department of Administrative Services, Construction Services
Office of Legal Affairs, Policy, and Procurement
450 Columbus Boulevard, Suite 1302
Hartford, CT 06103

Attn:

TABLE 1
SET-ASIDE CONTRACTOR SCHEDULE
 (make as many copies of this page as necessary)

***Amount:** The total dollar amount to be paid to the set aside contractors must not be less than the percentage(s) stated in the Bid Proposal Form.

****Class of Work:** Means the name of the trade work to be provided by the Subcontractor or Supplier.

| | |
|--|--------|
| Name: | SAMPLE |
| Address: | |
| *Amount: | |
| Indicate Whether: Subcontractor, Or Supplier, Or Both: | |
| **Class of Work: | |

| | |
|--|--------|
| Name: | SAMPLE |
| Address: | |
| *Amount: | |
| Indicate Whether: Subcontractor, Or Supplier, Or Both: | |
| **Class of Work: | |

| | |
|--|--------|
| Name: | SAMPLE |
| Address: | |
| *Amount: | |
| Indicate Whether: Subcontractor, Or Supplier, Or Both: | |
| **Class of Work: | |

| | |
|--|--------|
| Name: | SAMPLE |
| Address: | |
| *Amount: | |
| Indicate Whether: Subcontractor, Or Supplier, Or Both: | |
| **Class of Work: | |

**State Of Connecticut
Department of Administrative Services
Construction Services**

February 1, 2019

To: All Department of Administrative Services, Construction Services Contractors
Subject: Set-Aside Contract Laws

Dear Sir/Madam:

The administration of Governor Ned Lamont is committed to supporting the subject programs by encouraging all contractors on State projects to improve their efforts in these areas.

State law requires contractors doing business with the State to demonstrate non-discrimination by making "good faith efforts" in both hiring and in sub-contracting practices (Connecticut General Statutes Section [C.G.S. §] 4a-60).

What does "good faith efforts" mean? It means that you, as contractors, must act affirmatively. It is not good enough to say you can't find minorities and women. You must seek them out. That is the law, and the Department of Administrative Services (DAS) / Construction Services (CS) is committed to enforcing the law. At the same time, we are ready to assist you in making "good faith efforts."

DAS is required by C.G.S. § 4a-60g (b) and (c) to set aside projects (amounting to **twenty-five percent (25%)** of its annual contract awards) for small business and **twenty-five percent (25%)** of that amount for minority business enterprises. DAS may require any general contractor to set aside a portion of the contract for subcontractors who are small businesses or minority business enterprises in lieu of setting aside a project or in addition to setting aside a project.

Therefore, unless otherwise specified in the **Bid Proposal Form**, DAS will require contractors to subcontract **twenty-five percent (25%)** of the total contract value to small businesses certified by DAS and further will require contractors to subcontract 25% of that 25% to minority and women small contractors certified as minority business enterprises by DAS. These statutory goals represent the minimum values expected to be achieved by this program.

Together, we can meet the challenge of providing equal opportunity for minority and women-owned businesses and workers in our State. We expect superior results in the areas of affirmative action, equal employment opportunity, and set-aside contracts. The DAS standard in these areas is not just minimal effort. Our goal is to uphold the letter and the spirit of the law.

For more information on Non-Discrimination and Affirmative Action Provisions for State Contracts please visit the Commission on Human Rights and Opportunities (**CHRO**) Website at www.ct.gov/chro.

Sincerely yours,

Josh Geballe
Commissioner

PB:pb

Non-Discrimination and Affirmative Action Provisions for State Contracts

| Section 1 | CHRO – Contract Compliance Regulations Notification to Bidders: |
|-----------|--|
| 1.1 | <p>The contract to be awarded is subject to contract compliance requirements mandated by:</p> <ul style="list-style-type: none">1.1.1 The Connecticut General Statutes (C.G.S.) § 4a-60 and 4a-60a;1.1.2 C.G.S. § 46a-71(d) and 46a-81i (d) when the awarding agency is the State; and1.1.3 The Contract Compliance Regulations codified in the Regulations of Connecticut State Agencies (RSCA) §46a-68j-21 through 43, which establish a procedure for awarding all contracts covered by C.G.S. §4a-60 and 46a-71(d). |
| 1.2 | <p>According to the Contract Compliance Regulations §46a-68j-30(9), every agency awarding a contract subject to the contract compliance requirements has an obligation to “aggressively solicit the participation of legitimate minority business enterprises as bidders, contractors, subcontractors and suppliers of materials.”</p> <p>“Minority business enterprise” is defined in C.G.S §4a-60-as a small contractor or supplier of materials fifty-one (51%) percent or more of the capital stock or assets of which is owned by a person or persons:</p> <ul style="list-style-type: none">1.2.1 who are active in the daily affairs of the enterprise;1.2.2 who have the power to direct the management and policies of the enterprise; and1.2.3 who are members of a minority, as such term is defined in subsection (a) of C.G.S. §32-9n.” |
| 1.3 | <p>“Minority” groups are defined in C.G.S. §32-9n as:</p> <ul style="list-style-type: none">1.3.1 Black Americans, including all persons having origins in any of the Black African racial groups not of Hispanic origin;1.3.2 Hispanic Americans, including all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race;1.3.3 Persons who have origins in the Iberian Peninsula, including Portugal, regardless of race;1.3.4 Women;1.3.5 Asian Pacific Americans and Pacific Islanders; or1.3.6 American Indians and persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification.1.3.7 “Individuals with a disability” is also a minority business enterprise as provided by C.G.S. § 4a-60g (4). |
| 1.4 | <p>The above “Minority business enterprise” definitions apply to the contract compliance requirements by virtue of Contract Compliance Regulations §46a-68j-21(11).</p> <p>The awarding agency will consider the following factors when reviewing the bidder’s qualifications under the contract compliance requirements:</p> <ul style="list-style-type: none">1.4.1 the bidder’s success in implementing an affirmative action plan;1.4.2 the bidder’s success in developing an apprenticeship program complying with RSCA §46a-68-1 to 46a-68-17, inclusive;1.4.3 the bidder’s promise to develop and implement a successful affirmative action plan;1.4.4 the bidder’s submission of employment statistics contained in the “Employment Information Form”, indicating that the composition of its workforce is at or near parity when compared to the racial and sexual composition of the workforce in the relevant labor market area; and1.4.5 the bidder’s promise to set aside a portion of the contract for legitimate minority business enterprises. See Contract Compliance Regulations § 46a-68j-30(10) (E). |

Note: The Commission on Human Rights and Opportunities (CHRO) “Employment Information Form” shall be submitted to the DAS/CS Office of Legal Affairs, Policy, and Procurement on behalf of the awarding agency, the Department of Administrative Services (DAS).

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| Section 2 | Non-Discrimination and other Contract Compliance Requirements: |
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Pursuant to **C.G.S. §4a-60** and **§4a-60a** and **RSCA §46a-68j-21 to §46a-68j-43**, a contractor agrees to the following:

- 2.1** Not to discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, sexual orientation, mental retardation, or physical disability including, but not limited to, blindness (unless it is shown that such disability prevents performance of the work involved) in the performance of a contract, in any manner prohibited by the federal and Connecticut anti-discrimination and contract compliance laws;
- 2.2** To undertake affirmative action which will insure that applicants with job-related qualifications are employed and that employees are treated, when employed, without regard to whether they belong to any of the groups identified in Paragraph # 1) above;
- 2.3** To include a statement that the contractor is an “affirmative action-equal opportunity employer”, in all solicitations or advertisements for employees placed by or on behalf of the contractor;
- 2.4** To provide each labor union or representative of workers with which such contractor has a collective bargaining agreement and each vendor with which such contractor has a contract, a notice advising them of the contractor’s commitments under **C.G.S. §4a-60** and **§4a-60a**. The notice is available by contacting **CHRO**;
- 2.5** To post copies of the notice referred to in item 4) in conspicuous places available to employees and applicants;
- 2.6** To provide **CHRO** with such information requested by said agency, permit access to pertinent books, records, and accounts, concerning the employment practices and procedures of the contractor as relate to the provisions of **C.G.S. §4a-60, §4a-60a** and **§46a-56** and, cooperate fully with **CHRO**; and,
- 2.7** To include the language of **C.G.S. §4a-60 (a)** and **§4a-60a (a)** in every subcontract or purchase order executed to fulfill any obligation of the contract with DAS.

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| Section 3 | Affirmative Action Requirements for Certain Public Works Contracts for Construction: |
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Pursuant to **C.G.S. §46a-68c** and **§46a-68d** and **RSCA §46a-68j-21 to §46a-68j-29**, the following must file an affirmative action plan with the Commission:

- 3.1** A successful bidder on a ¹ “**public works contract**” with a value of **\$500,000** or more. The plan must be filed within **thirty (30)** days after a bid has been accepted by an awarding agency but before a contract is awarded. A plan may be filed in advance of, or at the same time as, a bid is submitted.
- 3.2** A contractor with **fifty (50)** or more employees who has been awarded a “**public works contract**” in excess of **\$50,000** in any fiscal year. A plan must be filed within **thirty (30) days** of the date a contract is awarded.

CHRO must review a plan within **sixty (60) days** of receipt and must either approve or reject a plan. Should **CHRO** approve an affirmative action plan, **CHRO** will issue a certificate of compliance. This certificate of compliance shall be proof of a successful bidder’s or a contractor’s eligibility to bid or be awarded contracts for a period of **two (2)** years from the date of the certificate. This certificate does not excuse a successful bidder or contractor from being monitored by the **CHRO** for implementation of its affirmative action plan or, from its reporting requirements under **C.G.S. 46a-68e** and **§ 46a-68f**. (Refer to Section 6) Also, **CHRO** may revoke the certificate if a successful bidder or contractor does not implement its affirmative action plan.

Should **CHRO** opt to disapprove an affirmative action plan, **CHRO** must notify the successful bidder or contractor in writing within **ten (10) days** of the disapproval. The notice will state the reason for disapproval and may provide necessary proposals to bring the plan into compliance. The successful bidder or contractor must then submit a new or amended plan, within **thirty (30) days** of the date the notice of disapproval is mailed by **CHRO**.

Section 3

(Continued):

In addition, **CHRO** may conditionally approve an affirmative action plan for a successful bidder on a public works contract valued at **\$500,000** or more. **CHRO** must notify the successful bidder in writing within **ten (10) days** of the conditional disapproval and state the reason for conditional approval and, may provide necessary proposals to bring the plan into compliance. The successful bidder must then submit a new or amended plan or, provide written assurances that it will amend its plan to conform to affirmative action requirements, within **thirty (30) days** of the date the notice is mailed by **CHRO**.

Note: The awarding agency (DAS) will provide a successful bidder or contractor with a copy of **CHRO**'s Affirmative Action Plan format. All sections of this Affirmative Action Plan format must be completed by the successful bidder or contractor and forwarded to **CHRO**. Also, the awarding agency (DAS) shall withhold **2%** of the total contract price per month from any payment made to a contractor until such time as the contractor has developed an affirmative action plan, which has been approved by **CHRO**.

¹ **“public works contract”** means any agreement between any individual, firm or corporation and the state or any political subdivision of the state other than a municipality for construction, rehabilitation, conversion, extension, demolition or repair of a public building, highway or other changes or improvements in real property, or which is financed in whole or in part by the state, including, but not limited to, matching expenditures, grants, loans, insurance or guarantees.-**C.G.S. §46a-68b**.

Section 4

“Good Faith Efforts” to Include Minority Business Enterprises as Subcontractors”:

In addition to, or in the absence of, any other subcontractor requirements included in this project, contractors are required to make ² **“good faith efforts”** to include minority business enterprises in the work of this project as subcontractors (for services and/or material suppliers). For the purpose of identifying minority business enterprises, a minority business enterprise shall be a subcontractor which has a valid certification as such from DAS and/or a subcontractor for which an affidavit has been submitted by the contractor attesting that the subcontractor named as a minority business enterprise meets the minority business enterprise criteria set out in **C.G.S. §4a-60(b)**.

² **“Good faith efforts”** means *“that **degree of diligence** which a reasonable person would exercise in the performance of legal duties and obligations”* and includes, but is not limited to, the following **factors**: the contractor’s employment and subcontracting policies and practices; affirmative advertising, recruitment, training, technical assistance activities and such other reasonable activities or efforts as **CHRO** may recommend to ensure the participation of minority business enterprises in state projects.

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| Section 5 | Set-Aside Program: |
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This contract may be subject to the provisions the **Set-Aside Program for Small Contractors** found at **C.G.S. § 4a-60g** and may be awarded only to a contractor certified as a small and/or minority business enterprise by DAS. The notification as to this special provision will be found in the **Bid Proposal Form** for this contract. The listing of eligible “Set-Aside” contractors is found on the [DAS Website for SBE or MBE Certification](#). In the event that the **Set-Aside Program for Small Contractors** applies to this contract, the following special provisions will also apply:

5.1 Amount of Work Required to Be Done by “Set-Aside” Contractors

A contractor awarded a contract on a project pursuant to the provisions of **C.G.S. §4a-60g**, as amended, shall be required to perform not less than **thirty (30)** per cent of the work with his/her own forces and shall ensure that not less than **fifty (50)** per cent of the work be performed by contractors or subcontractors who are certified as small contractors or minority business enterprises pursuant to **C.G.S. §4a-60g**.

The primary product/service performed by contractors working on a contract awarded under **C.G.S. §4a-60g** must be the same as the primary product/service described for the contractors on their “Certificate of Eligibility” which is provided to them by DAS.

5.2 Alternate Bonding Available to “Set Aside” Contractors

In lieu of a performance, bid, labor and materials or other required bond, a contractor or subcontractor awarded a contract under **C.G.S. §4a-60g** may provide to the awarding authority (DAS) and the awarding authority shall accept a “Letter of Credit”. Any such “Letter of Credit” shall be in an amount equal to **ten per cent (10%)** of the contract for any contract that is less than **one hundred thousand (\$100,000) dollars**, and in the amount of **twenty-five per cent (25%)** for any contract that is **one hundred thousand (\$100,000) dollars** or more.

5.3 Procedures to Follow Regarding Substitution of Named Project “Set-Aside” Subcontractors.

The awarding authority (DAS) may also require the contractor to set aside a portion of the contract for subcontractors who are eligible for set aside contracts. The awarding authority shall not permit substitution of a subcontractor for one named in accordance with the provisions of **C.G.S. § 4b-95** or substitution of a subcontractor for any designated sub-trade work bid to be performed by the contractor’s own forces, except for good cause.

Pursuant to **C.G.S. § 4b-95**, the term “**good cause**” includes but is not limited to a subcontractor’s or, where appropriate, a general contractor’s:

- 5.3.1** Death or physical disability, if the listed subcontractor is an individual;
- 5.3.2** Dissolution, if a corporation or partnership;
- 5.3.3** Bankruptcy;
- 5.3.4** Inability to furnish any performance and payment bond shown on the bid form;
- 5.3.5** Inability to obtain, or loss of, a license necessary for the performance of the particular category of work;
- 5.3.6** Failure or inability to comply with a requirement of law applicable to contractors and subcontractors, or to subcontracts for construction, alteration, or repair projects;
- 5.3.7** Failure to perform his/her agreement to execute a subcontract under **C.G.S. § 4b-96**.

Any general contractor who violates any provision of **C.G.S. § 4b-95** shall be disqualified from bidding on other contracts that are subject to the provisions of **Chapter 60 - Construction and Alterations of State Buildings of the C.G.S**, for a period **not to exceed twenty-four (24) months**, commencing from the date on which the violation is discovered, for each violation.

| | |
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| Section 6 | Contract Monitoring and Reporting: |
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- 6.1** CHRO has the authority to monitor state contractors pursuant to **C.G.S. § 46a-68e** and **46a-68f** and **RSCA §46a-68j-23(3)**. In addition, under the **RSCA §46a-68j-25(e)** and **46a-68j-26 (g)**, CHRO has the authority to monitor the implementation of an affirmative action plan regarding:
- 6.1.1** a successful bidder who has been awarded a public works contract valued at **\$500,000 or more** and;
 - 6.1.2** a contractor with **fifty (50)** or more employees who has been awarded a public works contract **in excess of \$50,000 in any fiscal year**.
- 6.2** In order to monitor the implementation of these plans CHRO requires that the following contract monitoring reports be compiled and submitted:
- 6.2.1 Monthly Employment Utilization Report (Form CHRO: 257):** A contractor, on behalf of itself and all subcontractors who perform work on the project during a given month, is required to report on the work hour participation of minority male and female workers in each trade category on the project. The report must be submitted to the contract awarding agency (**DAS**) and to the Commission by the 15th day following the end of each calendar month during the term of the on-site construction work of the project.
Website page: <http://www.ct.gov/chro>, then click on **Forms**, then click on **Contract Compliance Forms and Reports**.
 - 6.2.2 Quarterly Small Contractor and Minority Business Enterprise Payment Status Report (Form CHRO: 258):** A contractor is required to report on the participation of small contractors or minority business enterprises identified to participate on the project. The report must be submitted to the contract awarding agency (DAS) and to the Commission by the 15th day following the end of each calendar quarter during the term of the on-site construction work of the project.
Website page: <http://www.ct.gov/chro>, then click on **Forms**, then click on **Contract Compliance Forms and Reports**.
 - 6.2.3** In addition, the Commission expects that a contractor will designate an Equal Opportunity/Contract Compliance Officer for its public works project who will compile the above monthly and quarterly reports, as well as, undertake the following responsibilities for implementation of its project Affirmative Action Plan (AAP):
 - .1 Maintain a project Equal Employment Opportunity (EEO) file to include all records, correspondence and other documentation relate to the project AAP.
 - .2 Communicate to and inform all project subcontractors, regardless of tier, and labor referral organizations (if applicable) about project equal employment and AAP commitments and performance requirements.
 - .3 Participate in project job meetings to inform project subcontractors about project equal employment and AAP performance requirements.
 - .4 Track the use of employment recruitment sources identified in the project AAP regarding all employment opportunities with all subcontractors on the project. Also, maintain documentation of all contacts with these recruitment sources and their responses.

The Commission will forward a copy of the monthly and quarterly report to each contractor on a public works project.

| | |
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| NOTES: | Bidders and state contractors may review the full text of the before referenced Connecticut General Statutes by accessing either the State Law Library’s web site (http://www.cslib.org/psaindex.htm) or the State Legislatures’ web site (http://www.cga.ct.gov). |
| | The full text of the RSCA 46a-68j-21 through 46a-68j-43 may be reviewed by accessing the Commission’s web site: http://www.ct.gov/chro/cwp/view.asp?a=2525&Q=315900&chroPNavCtr=#45679 In the alternative, bidders or state contractors may request a copy of these state statutes and regulations by contacting the Commission at (860) 541-3400 (in Hartford) or 1 (800) 477-5737. |

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| Section 7 | CHRO Contract Compliance Forms: |
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The following CHRO Contract Compliance Forms are available on the CHRO Website:

- 7.1 **Monthly Employment Utilization Report (Form CHRO-257 and CHRO-257a):**
 - <http://www.ct.gov/chro/lib/chro/257s.pdf>
- 7.2 **Cumulative Utilization Report (Form CHRO-257b):**
 - <http://www.ct.gov/chro/lib/chro/257b.pdf>
- 7.3 **Monthly Small Contractor & MBE Payment Status Report (Form CHRO-258a) and Quarterly Small Contractor & MBE Payment Status Report (Form CHRO-258):**
 - <http://www.ct.gov/chro/lib/chro/258s.pdf>

End of Section
00 73 38 CHRO / Contract Compliance Regulations

State of Connecticut
Commission on Human Rights and Opportunities (CHRO)
Bidder Contract Compliance Monitoring Report Requirements
for Projects with Construction Costs Estimated to be Less Than \$500,000

DAS ● Construction Services ● Office of Legal Affairs, Policy, and Procurement

1.0 CHRO Bidder Contract Compliance Monitoring Report

1.1 Requirements:

1.1.1 All Bidders must complete in full, sign, and upload the **CHRO Bidder Contract Compliance Monitoring Report** to **CTsource** with their other **Bid Package Documents** for this solicitation *prior* to the date and time of the Bid Opening.

1.2 Instructions:

- 1.2.1** Download the PDF-fillable version of the [Notification to Bidders/Contract Compliance Monitoring Form](https://portal.ct.gov/CHRO/Contract-Compliance/Contract-Compliance/Contract-Compliance-Forms-and-Reports#45679) from the **CHRO webpage**:
<https://portal.ct.gov/CHRO/Contract-Compliance/Contract-Compliance/Contract-Compliance-Forms-and-Reports#45679>
- 1.2.2** Save the document to your computer.
- 1.2.3** Open the document from your computer and follow the instructions for completing the report.
- 1.2.4** Print the **Bidder Contract Compliance Monitoring Report** to paper and sign where indicated.
- 1.2.5** Scan the report to PDF and save to your computer.
- 1.2.6** Upload your **Bidder Contract Compliance Monitoring Report** to **CTsource** with your other **Bid Package Documents** for this solicitation *prior* to the date and time of the Bid Opening.
- 1.2.7** If you have any questions regarding your certificate, visit the **CHRO webpage** (<https://www.ct.gov/chro/cwp/view.asp?a=2525&Q=315900&chroPNavCtr=#45679>) or call the CHRO at **860-541-4709**.

**Minimum Rates and Classifications
 for Building Construction**

**Connecticut Department of Labor
 Wage and Workplace Standards Division**

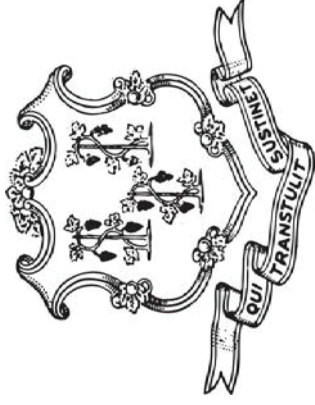
By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following pages are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or sub-contractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his hourly wage.

| | | | |
|--|-----------------|----------------------|------------------|
| Project Number: | BI-T-615 | Project Town: | Watertown |
| Project: New West District Headquarters | | | |
| Black Rock State Park | | | |
| 2065 Thomaston Road, | | | |
| Watertown, CT | | | |

The following pages contain:

| | |
|--|---------|
| Contractors Wage Certification Form | 1 page |
| Notice to all Mason Contractors reference Section 31-53 of C.G.S. (Prevailing Wages) | 1 page |
| Prevailing Wage Rates - English | 7 pages |
| Informational Bulletin - Occupational Classifications | 6 pages |
| Informational Bulletin – The 10-Hour OSHA Construction Safety and Health Course | 2 pages |
| Footnotes | 2 pages |
| Special Notice re: Wage Rate Adjustments | 1 pages |
| Weekly Payroll Certification Form (WWS-CP1) | 1 page |
| Fringe Benefits Explanation (P) | 1 page |
| Weekly Payroll Certification Form (WWS-CP2) | 1 page |

As of: March 5, 2021



THIS IS A PUBLIC WORKS PROJECT

Covered by the

PREVAILING WAGE LAW

CT General Statutes Section 31-53

**If you have QUESTIONS regarding your wages
CALL (860) 263-6790**

Section 31-55 of the CT State Statutes requires every contractor or subcontractor performing work for the state to post in a prominent place the prevailing wages as determined by the Labor Commissioner.

CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION

CONTRACTORS WAGE CERTIFICATION FORM
Construction Manager at Risk/General Contractor/Prime Contractor

I, _____ of _____
Officer, Owner, Authorized Rep. Company Name

do hereby certify that the _____
Company Name

Street

City

and all of its subcontractors will pay all workers on the

Project Name and Number

Street and City

the wages as listed in the schedule of prevailing rates required for such project (a copy of which is attached hereto).

Signed

Subscribed and sworn to before me this _____ day of _____, _____.

Notary Public

Return to:

Connecticut Department of Labor
Wage & Workplace Standards Division
200 Folly Brook Blvd.
Wethersfield, CT 06109

Rate Schedule Issued (Date): _____

November 29, 2006

Notice
To All Mason Contractors and Interested Parties
Regarding Construction Pursuant to Section 31-53 of the
Connecticut General Statutes (Prevailing Wage)

The Connecticut Labor Department Wage and Workplace Standards Division is empowered to enforce the prevailing wage rates on projects covered by the above referenced statute.

Over the past few years the Division has withheld enforcement of the rate in effect for workers who operate a forklift on a prevailing wage rate project due to a potential jurisdictional dispute.

The rate listed in the schedules and in our Occupational Bulletin (see enclosed) has been as follows:

Forklift Operator:

- **Laborers (Group 4) Mason Tenders** - operates forklift solely to assist a mason to a maximum height of nine feet only.
- **Power Equipment Operator (Group 9)** - operates forklift to assist any trade and to assist a mason to a height over nine feet.

The U.S. Labor Department conducted a survey of rates in Connecticut but it has not been published and the rate in effect remains as outlined in the above Occupational Bulletin.

Since this is a classification matter and not one of jurisdiction, effective January 1, 2007 the Connecticut Labor Department will enforce the rate on each schedule in accordance with our statutory authority.

Your cooperation in filing appropriate and accurate certified payrolls is appreciated.

Sec. 31-53b. Construction safety and health course. New miner training program. Proof of completion required for mechanics, laborers and workers on public works projects. Enforcement. Regulations. Exceptions. (a) Each contract for a public works project entered into on or after July 1, 2009, by the state or any of its agents, or by any political subdivision of the state or any of its agents, described in subsection (g) of section 31-53, shall contain a provision requiring that each contractor furnish proof with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 on such public works project, pursuant to such contract, has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 48 or, in the case of telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268.

(b) Any person required to complete a course or program under subsection (a) of this section who has not completed the course or program shall be subject to removal from the worksite if the person does not provide documentation of having completed such course or program by the fifteenth day after the date the person is found to be in noncompliance. The Labor Commissioner or said commissioner's designee shall enforce this section.

(c) Not later than January 1, 2009, the Labor Commissioner shall adopt regulations, in accordance with the provisions of chapter 54, to implement the provisions of subsections (a) and (b) of this section. Such regulations shall require that the ten-hour construction safety and health courses required under subsection (a) of this section be conducted in accordance with federal Occupational Safety and Health Administration Training Institute standards, or in accordance with Federal Mine Safety and Health Administration Standards or in accordance with 29 CFR 1910.268, as appropriate. The Labor Commissioner shall accept as sufficient proof of compliance with the provisions of subsection (a) or (b) of this section a student course completion card issued by the federal Occupational Safety and Health Administration Training Institute, or such other proof of compliance said commissioner deems appropriate, dated no earlier than five years before the commencement date of such public works project.

(d) This section shall not apply to employees of public service companies, as defined in section 16-1, or drivers of commercial motor vehicles driving the vehicle on the public works project and delivering or picking up cargo from public works projects provided they perform no labor relating to the project other than the loading and unloading of their cargo.

(P.A. 06-175, S. 1; P.A. 08-83, S. 1.)

History: P.A. 08-83 amended Subsec. (a) by making provisions applicable to public works project contracts entered into on or after July 1, 2009, replacing provision re total cost of work with reference to Sec. 31-53(g), requiring proof in certified payroll form that new mechanic, laborer or worker has completed a 10-hour or more construction safety course and adding provision re new miner training program, amended Subsec. (b) by substituting "person" for "employee" and adding "or program", amended Subsec. (c) by adding "or in accordance with Federal Mine Safety and Health Administration Standards" and setting new deadline of January 1, 2009, deleted former Subsec. (d) re "public building", added new Subsec. (d) re exemptions for public service company employees and delivery drivers who perform no labor other than delivery and made conforming and technical changes, effective January 1, 2009.

Important Information:

For use with Building, Heavy/Highway, and Residential

Welders: Rate for craft to which welding is incidental.

*Note: Hazardous waste removal work receives additional \$1.25 per hour for truck drivers.

**Note: Hazardous waste premium \$3.00 per hour over classified rate.

ALL Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra \$4.00 premium in addition to the hourly wage rate and benefit contributions:

- 1) Crane handling or erecting structural steel or stone; hoisting engineer (2 drums or over)
- 2) Cranes (100 ton rate capacity and over) Bauer Drill/Caisson
- 3) Cranes (under 100 ton rated capacity)

Crane with boom including jib, 150 feet - \$1.50 extra.

Crane with boom including jib, 200 feet - \$2.50 extra.

Crane with boom including jib, 250 feet - \$5.00 extra.

Crane with boom including jib, 300 feet - \$7.00 extra.

Crane with boom including jib, 400 feet - \$10.00 extra.

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

- Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyman instructing and supervising the work of one apprentice in a specific trade.

Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing state work

- The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.
- Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.
- It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.
- The annual adjustments will be posted on the Department of Labor's Web page: www.ctdol.state.ct.us.
- The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.
- All subsequent annual adjustments will be posted on our Web Site for contractor access.

Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage.

- All Persons who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.
- All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)
- Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

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 clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

Minimum Rates and Classifications for Building Construction

ID#: 21-20419

**Connecticut Department of Labor
Wage and Workplace Standards Division**

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number: #BI-T-615

Project Town: Watertown

State#: #BI-T-615

FAP#: Watertown

Project: Construction of New West District Headquarters at Black Rock State Park (Watertown)

| CLASSIFICATION | Hourly Rate | Benefits |
|---|-------------|-----------|
| 1b) Asbestos/Toxic Waste Removal Laborers: Asbestos removal and encapsulation (except its removal from mechanical systems which are not to be scrapped), toxic waste removers, blasters. **See Laborers Group 7** | | |
| 1c) Asbestos Worker/Heat and Frost Insulator | 42.07 | 30.99 |
| 2) Boilermaker | 38.34 | 26.01 |
| 3a) Bricklayer, Cement Mason, Concrete Finisher (including caulking), Stone Masons | 36.18 | 34.59 + a |
| 3b) Tile Setter | 34.9 | 25.87 |
| 3c) Terrazzo Mechanics and Marble Setters | 31.69 | 22.35 |
| 3d) Tile, Marble & Terrazzo Finishers | 26.7 | 21.75 |
| 3e) Plasterer | 33.48 | 32.06 |
| -----LABORERS----- | | |
| 4) Group 1: Laborers (common or general), acetylene burners, concrete specialists, wrecking laborers, fire watchers. | 31.0 | 22.15 |
| 4a) Group 2: Mortar mixers, plaster tender, power buggy operators, powdermen, fireproofers/mixer/nozzlemans (Person running mixer and spraying fireproof only). | 31.25 | 22.15 |

Project: Construction of New West District Headquarters at Black Rock State Park (Watertown)

| | | |
|---|-------|------------------------|
| 4b) Group 3: Jackhammer operators/pavement breaker, mason tender (brick), mason tender (cement/concrete), forklift operators and forklift operators (masonry). | 31.5 | 22.15 |
| 4c) **Group 4: Pipelayers (Installation of water, storm drainage or sewage lines outside of the building line with P6, P7 license) (the pipelayer rate shall apply only to one or two employees of the total crew who primary task is to actually perform the mating of pipe sections) P6 and P7 rate is \$26.80. | 32.0 | 22.15 |
| 4d) Group 5: Air track operator, sand blaster and hydraulic drills. | 31.75 | 22.15 |
| 4e) Group 6: Blasters, nuclear and toxic waste removal. | 34.0 | 22.15 |
| 4f) Group 7: Asbestos/lead removal and encapsulation (except it's removal from mechanical systems which are not to be scrapped). | 32.0 | 22.15 |
| 4g) Group 8: Bottom men on open air caisson, cylindrical work and boring crew. | 29.28 | 22.15 |
| 4h) Group 9: Top men on open air caisson, cylindrical work and boring crew. | 28.74 | 22.15 |
| 4i) Group 10: Traffic Control Signalman | 18.0 | 22.15 |
| 5) Carpenter, Acoustical Ceiling Installation, Soft Floor/Carpet Laying, Metal Stud Installation, Form Work and Scaffold Building, Drywall Hanging, Modular-Furniture Systems Installers, Lathers, Piledrivers, Resilient Floor Layers. | 34.53 | 25.64 |
| 5a) Millwrights | 35.64 | 26.49 |
| 6) Electrical Worker (including low voltage wiring) (Trade License required: E1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9) | 39.92 | 28.75+3% of gross wage |
| 7a) Elevator Mechanic (Trade License required: R-1,2,5,6) | 55.12 | 34.765+a+b |
| -----LINE CONSTRUCTION----- | | |
| Groundman | 26.5 | 6.5% + 9.00 |
| Linemen/Cable Splicer | 48.19 | 6.5% + 22.00 |
| 8) Glazier (Trade License required: FG-1,2) | 39.18 | 22.55 + a |

Project: Construction of New West District Headquarters at Black Rock State Park (Watertown)

| | | |
|--|-------|-----------|
| 9) Ironworker, Ornamental, Reinforcing, Structural, and Precast Concrete Erection | 36.67 | 37.62 + a |
| -----OPERATORS----- | | |
| Group 1: Crane handling or erecting structural steel or stone, hoisting engineer 2 drums or over, front end loader (7 cubic yards or over), work boat 26 ft. and over and Tunnel Boring Machines. (Trade License Required) | 42.45 | 25.30 + a |
| Group 2: Cranes (100 ton rate capacity and over); Excavator over 2 cubic yards; Piledriver (\$3.00 premium when operator controls hammer); Bauer Drill/Caisson. (Trade License Required) | 42.11 | 25.30 + a |
| Group 3: Excavator; Backhoe/Excavator under 2 cubic yards; Cranes (under 100 ton rated capacity), Grader/Blade; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar); Grader Operator; Bulldozer Fine Grade. (slopes, shaping, laser or GPS, etc.). (Trade License Required) | 41.32 | 25.30 + a |
| Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper). | 40.91 | 25.30 + a |
| Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24 | 40.28 | 25.30 + a |
| Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller; Pile Testing Machine. | 40.28 | 25.30 + a |
| Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer). | 39.95 | 25.30 + a |
| Group 7: Asphalt roller, concrete saws and cutters (ride on types), vermeer concrete cutter, Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24 | 39.59 | 25.30 + a |
| Group 8: Mechanic, grease truck operator, hydroblaster; barrier mover; power stone spreader; welding; work boat under 26 ft.; transfer machine. | 39.17 | 25.30 + a |
| Group 9: Front end loader (under 3 cubic yards), skid steer loader regardless of attachments, (Bobcat or Similar): forklift, power chipper; landscape equipment (including Hydroseeder). | 38.71 | 25.30 + a |
| Group 10: Vibratory hammer; ice machine; diesel and air, hammer, etc. | 36.54 | 25.30 + a |
| Group 11: Conveyor, earth roller, power pavement breaker (whiphammer), robot demolition equipment. | 36.54 | 25.30 + a |

Project: Construction of New West District Headquarters at Black Rock State Park (Watertown)

| | | |
|--|-------|-----------|
| Group 12: Wellpoint operator. | 36.48 | 25.30 + a |
| Group 13: Compressor battery operator. | 35.86 | 25.30 + a |
| Group 14: Elevator operator; tow motor operator (solid tire no rough terrain). | 34.66 | 25.30 + a |
| Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator. | 34.23 | 25.30 + a |
| Group 16: Maintenance Engineer/Oiler. | 33.54 | 25.30 + a |
| Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator. | 38.11 | 25.30 + a |
| Group 18: Power safety boat; vacuum truck; zim mixer; sweeper; (Minimum for any job requiring a CDL license). | 35.53 | 25.30 + a |
| -----PAINTERS (Including Drywall Finishing)----- | | |
| 10a) Brush and Roller | 35.62 | 22.55 |
| 10b) Taping Only/Drywall Finishing | 36.37 | 22.55 |
| 10c) Paperhanger and Red Label | 36.12 | 22.55 |
| 10e) Blast and Spray | 38.62 | 22.55 |
| 11) Plumber (excluding HVAC pipe installation) (Trade License required: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2) | 44.63 | 32.95 |
| 12) Well Digger, Pile Testing Machine | 37.26 | 24.05 + a |
| Rofer: Cole Tar Pitch | 42.0 | 19.55 + a |
| Rofer: Slate, Tile, Composition, Shingles, Singly Ply and Damp/Waterproofing | 40.5 | 19.55 + a |
| 15) Sheetmetal Worker (Trade License required for HVAC and Ductwork: SM-1,SM-2,SM-3,SM-4,SM-5,SM-6) | 46.92 | 42.80 |
| 16) Pipefitter (Including HVAC work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4, G-1, G-2, G-8 & G-9) | 44.63 | 32.95 |

-----TRUCK DRIVERS-----

| | | |
|--|-------|-----------|
| 17a) 2 Axle | 29.86 | 25.79 + a |
| <hr/> | | |
| 17b) 3 Axle, 2 Axle Ready Mix | 29.97 | 25.79 + a |
| <hr/> | | |
| 17c) 3 Axle Ready Mix | 30.03 | 25.79 + a |
| <hr/> | | |
| 17d) 4 Axle, Heavy Duty Trailer up to 40 tons | 30.08 | 25.79 + a |
| <hr/> | | |
| 17e) 4 Axle Ready Mix | 30.13 | 25.79 + a |
| <hr/> | | |
| 17f) Heavy Duty Trailer (40 Tons and Over) | 30.35 | 25.79 + a |
| <hr/> | | |
| 17g) Specialized Earth Moving Equipment (Other Than Conventional Type on-the-Road Trucks and Semi-Trailers, Including Euclids) | 30.13 | 25.79 + a |
| <hr/> | | |
| 18) Sprinkler Fitter (Trade License required: F-1,2,3,4) | 45.92 | 26.08 + a |
| <hr/> | | |
| 19) Theatrical Stage Journeyman | 25.76 | 7.34 |
| <hr/> | | |

Welders: Rate for craft to which welding is incidental.

**Note: Hazardous waste removal work receives additional \$1.25 per hour for truck drivers.*

***Note: Hazardous waste premium \$3.00 per hour over classified rate*

ALL Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra \$4.00 premium in addition to the hourly wage rate and benefit contributions:

- 1) Crane handling or erecting structural steel or stone; hoisting engineer (2 drums or over)***
- 2) Cranes (100 ton rate capacity and over) Bauer Drill/Caisson***
- 3) Cranes (under 100 ton rated capacity)***

Crane with 150 ft. boom (including jib) - \$1.50 extra

Crane with 200 ft. boom (including jib) - \$2.50 extra

Crane with 250 ft. boom (including jib) - \$5.00 extra

Crane with 300 ft. boom (including jib) - \$7.00 extra

Crane with 400 ft. boom (including jib) - \$10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyman instructing and supervising the work of each apprentice in a specific trade.

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page: www.ct.gov/dol. For those without internet access, please contact the division listed below.

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

All subsequent annual adjustments will be posted on our Web Site for contractor access.

Contracting Agencies are under no obligation pursuant to State labor law to pay any increase due to the annual adjustment provision.

Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

Project: Construction of New West District Headquarters at Black Rock State Park (Watertown)

~~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 clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

Information Bulletin *Occupational Classifications*

The Connecticut Department of Labor has the responsibility to properly determine "job classification" on prevailing wage projects covered under C.G.S. Section 31-53(d).

Note: This information is intended to provide a sample of some occupational classifications for guidance purposes only. It is not an all-inclusive list of each occupation's duties. This list is being provided only to highlight some areas where a contractor may be unclear regarding the proper classification. If unsure, the employer should seek guidelines for CTDOL.

Below are additional clarifications of specific job duties performed for certain classifications:

- **ASBESTOS WORKERS**

Applies all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.

- **ASBESTOS INSULATOR**

Handle, install apply, fabricate, distribute, prepare, alter, repair, dismantle, heat and frost insulation, including penetration and fire stopping work on all penetration fire stop systems.

- **BOILERMAKERS**

Erects hydro plants, incomplete vessels, steel stacks, storage tanks for water, fuel, etc. Builds incomplete boilers, repairs heat exchanges and steam generators.

- **BRICKLAYERS, CEMENT MASONS, CEMENT FINISHERS, MARBLE MASONS, PLASTERERS, STONE MASONS, PLASTERERS. STONE MASONS, TERRAZZO WORKERS, TILE SETTERS**

Lays building materials such as brick, structural tile and concrete cinder, glass, gypsum, terra cotta block. Cuts, tools and sets marble, sets stone, finishes concrete, applies decorative steel, aluminum and plastic tile, applies cements, sand, pigment and marble chips to floors, stairways, etc.

- **CARPENTERS, MILLWRIGHTS. PILEDRIVERMEN. LATHERS. RESILEINT FLOOR LAYERS, DOCK BUILDERS, DIKERS, DIVER TENDERS**

Constructs, erects, installs and repairs structures and fixtures of wood, plywood and wallboard. Installs, assembles, dismantles, moves industrial machinery. Drives piling into ground to provide foundations for structures such as buildings and bridges, retaining walls for earth embankments, such as cofferdams. Fastens wooden, metal or rockboard lath to walls, ceilings and partitions of buildings, acoustical tile layer, concrete form builder. Applies firestopping materials on fire resistive joint systems only. Installation of curtain/window walls only where attached to wood or metal studs. Installation of insulated material of all types whether blown, nailed or attached in other ways to walls, ceilings and floors of buildings. Assembly and installation of modular furniture/furniture systems. Free-standing furniture is not covered. This includes free standing: student chairs, study top desks, book box desks, computer furniture, dictionary stand, atlas stand, wood shelving, two-position information access station, file cabinets, storage cabinets, tables, etc.

- **LABORER, CLEANING**

- The clean up of any construction debris and the general (heavy/light) cleaning, including sweeping, wash down, mopping, wiping of the construction facility and its furniture, washing, polishing, and dusting.

- **DELIVERY PERSONNEL**

- If delivery of supplies/building materials is to one common point and stockpiled there, prevailing wages are not required. If the delivery personnel are involved in the distribution of the material to multiple locations within the construction site then they would have to be paid prevailing wages for the type of work performed: laborer, equipment operator, electrician, ironworker, plumber, etc.

- An example of this would be where delivery of drywall is made to a building and the delivery personnel distribute the drywall from one "stockpile" location to further sub-locations on each floor. Distribution of material around a construction site is the job of a laborer or tradesman, and not a delivery personnel.

- **ELECTRICIANS**

Install, erect, maintenance, alteration or repair of any wire, cable, conduit, etc., which generates, transforms, transmits or uses electrical energy for light, heat, power or other purposes, including the Installation or maintenance of telecommunication, LAN wiring or computer equipment, and low voltage wiring. ****License required per Connecticut General Statutes: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9.***

- **ELEVATOR CONSTRUCTORS**

Install, erect, maintenance and repair of all types of elevators, escalators, dumb waiters and moving walks. **License required by Connecticut General Statutes: R-1,2,5,6.*

- **FORK LIFT OPERATOR**

Laborers Group 4) Mason Tenders - operates forklift solely to assist a mason to a maximum height of nine (9) feet only.

Power Equipment Operator Group 9 - operates forklift to assist any trade, and to assist a mason to a height over nine (9) feet.

- **GLAZIERS**

Glazing wood and metal sash, doors, partitions, and 2 story aluminum storefronts. Installs glass windows, skylights, store fronts and display cases or surfaces such as building fronts, interior walls, ceilings and table tops and metal store fronts. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers, which require equal composite workforce.

- **IRONWORKERS**

Erection, installation and placement of structural steel, precast concrete, miscellaneous iron, ornamental iron, metal curtain wall, rigging and reinforcing steel. Handling, sorting, and installation of reinforcing steel (rebar). Metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which require equal composite workforce.

- **INSULATOR**

- Installing fire stopping systems/materials for "Penetration Firestop Systems": transit to cables, electrical conduits, insulated pipes, sprinkler pipe penetrations, ductwork behind radiation, electrical cable trays, fire rated pipe penetrations, natural polypropylene, HVAC ducts, plumbing bare metal, telephone and communication wires, and boiler room ceilings.

- **LABORERS**

Acetylene burners, asphalt rakers, chain saw operators, concrete and power buggy operator, concrete saw operator, fence and guard rail erector (except metal bridge rail (traffic), decorative security fence (non-metal)).

installation.), hand operated concrete vibrator operator, mason tenders, pipelayers (installation of storm drainage or sewage lines on the street only), pneumatic drill operator, pneumatic gas and electric drill operator, powermen and wagon drill operator, air track operator, block paver, curb setters, blasters, concrete spreaders.

- **PAINTERS**

Maintenance, preparation, cleaning, blasting (water and sand, etc.), painting or application of any protective coatings of every description on all bridges and appurtenances of highways, roadways, and railroads. Painting, decorating, hardwood finishing, paper hanging, sign writing, scenic art work and drywall hhg for any and all types of building and residential work.

- **LEAD PAINT REMOVAL**

- Painter's Rate

1. Removal of lead paint from bridges.
2. Removal of lead paint as preparation of any surface to be repainted.
3. Where removal is on a Demolition project prior to reconstruction.

- Laborer's Rate

1. Removal of lead paint from any surface NOT to be repainted.
2. Where removal is on a *TOTAL* Demolition project only.

- **PLUMBERS AND PIPEFITTERS**

Installation, repair, replacement, alteration or maintenance of all plumbing, heating, cooling and piping. **License required per Connecticut General Statutes: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2 S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4.*

- **POWER EQUIPMENT OPERATORS**

Operates several types of power construction equipment such as compressors, pumps, hoists, derricks, cranes, shovels, tractors, scrapers or motor graders, etc. Repairs and maintains equipment. **License required, crane operators only, per Connecticut General Statutes.*

- **ROOFERS**

Covers roofs with composition shingles or sheets, wood shingles, slate or asphalt and gravel to waterproof roofs, including preparation of surface. (demolition or removal of any type of roofing and or clean-up of any and all areas where a roof is to be relaid.)

- **SHEETMETAL WORKERS**

Fabricate, assembles, installs and repairs sheetmetal products and equipment in such areas as ventilation, air-conditioning, warm air heating, restaurant equipment, architectural sheet metal work, sheetmetal roofing, and aluminum gutters. Fabrication, handling, assembling, erecting, altering, repairing, etc. of coated metal material panels and composite metal material panels when used on building exteriors and interiors as soffits, fascia, louvers, partitions, canopies, cornice, column covers, awnings, beam covers, cladding, sun shades, lighting troughs, spires, ornamental roofing, metal ceilings, mansards, copings, ornamental and ventilation hoods, vertical and horizontal siding panels, trim, etc. The sheet metal classification also applies to the vast variety of coated metal material panels and composite metal material panels that have evolved over the years as an alternative to conventional ferrous and non-ferrous metals like steel, iron, tin, copper, brass, bronze, aluminum, etc. Fabrication, handling, assembling, erecting, altering, repairing, etc. of architectural metal roof, standing seam roof, composite metal roof, metal and composite bathroom/toilet partitions, aluminum gutters, metal and composite lockers and shelving, kitchen equipment, and walk-in coolers. To include testing and air –balancing ancillary to installation and construction.

- **SPRINKLER FITTERS**

Installation, alteration, maintenance and repair of fire protection sprinkler systems.

****License required per Connecticut General Statutes: F-1,2,3,4.***

- **TILE MARBLE AND TERRAZZO FINISHERS**

Assists and tends the tile setter, marble mason and terrazzo worker in the performance of their duties.

- **TRUCK DRIVERS**

~How to pay truck drivers delivering asphalt is under REVISION~

Truck Drivers are requires to be paid prevailing wage for time spent "working" directly on the site. These drivers remain covered by the prevailing wage for any time spent transporting between the actual construction location and facilities (such as fabrication, plants, mobile factories, batch plant, borrow pits, job headquarters, tool yards, etc.) dedicated exclusively, or nearly so, to performance of the contract or project, which are so located in proximity to the actual construction location that it is reasonable to include them. ****License required, drivers only, per Connecticut General Statutes.***

For example:

- Material men and deliverymen are not covered under prevailing wage as long as they are not directly involved in the construction process. If, they unload the material, they would then be covered by prevailing wage for the classification they are performing work in: laborer, equipment operator, etc.
- Hauling material off site is not covered provided they are not dumping it at a location outlined above.
- Driving a truck on site and moving equipment or materials on site would be considered covered work, as this is part of the construction process.

➤ *Any questions regarding the proper classification should be directed to:*
Public Contract Compliance Unit
Wage and Workplace Standards Division
Connecticut Department of Labor
200 Folly Brook Blvd, Wethersfield, CT 06109
(860) 263-6543.

Informational Bulletin

THE 10-HOUR OSHA CONSTRUCTION SAFETY AND HEALTH COURSE

(applicable to public building contracts entered into *on or after July 1, 2007*, where the total cost of all work to be performed is at least \$100,000)

- (1) This requirement was created by Public Act No. 06-175, which is codified in Section 31-53b of the Connecticut General Statutes (pertaining to the prevailing wage statutes);
- (2) The course is required for public building construction contracts (projects funded in whole or in part by the state or any political subdivision of the state) entered into on or after July 1, 2007;
- (3) It is required of private employees (not state or municipal employees) and apprentices who perform manual labor for a general contractor or subcontractor on a public building project where the total cost of all work to be performed is at least \$100,000;
- (4) The ten-hour construction course pertains to the ten-hour Outreach Course conducted in accordance with federal OSHA Training Institute standards, and, for telecommunications workers, a ten-hour training course conducted in accordance with federal OSHA standard, 29 CFR 1910.268;
- (5) The internet website for the federal OSHA Training Institute is http://www.osha.gov/fso/ote/training/edcenters/fact_sheet.html;
- (6) The statutory language leaves it to the contractor and its employees to determine who pays for the cost of the ten-hour Outreach Course;
- (7) Within 30 days of receiving a contract award, a general contractor must furnish proof to the Labor Commissioner that all employees and apprentices performing manual labor on the project will have completed such a course;
- (8) Proof of completion may be demonstrated through either: (a) the presentation of a *bona fide* student course completion card issued by the federal OSHA Training Institute; *or* (2) the presentation of documentation provided to an employee by a trainer certified by the Institute pending the actual issuance of the completion card;
- (9) Any card with an issuance date more than 5 years prior to the commencement date of the construction project shall not constitute proof of compliance;

- (10) Each employer shall affix a copy of the construction safety course completion card to the certified payroll submitted to the contracting agency in accordance with Conn. Gen. Stat. § 31-53(f) on which such employee's name first appears;
- (11) Any employee found to be in non-compliance shall be subject to removal from the worksite if such employee does not provide satisfactory proof of course completion to the Labor Commissioner by the fifteenth day after the date the employee is determined to be in noncompliance;
- (12) Any such employee who is determined to be in noncompliance may continue to work on a public building construction project for a maximum of fourteen consecutive calendar days while bringing his or her status into compliance;
- (13) The Labor Commissioner may make complaint to the prosecuting authorities regarding any employer or agent of the employer, or officer or agent of the corporation who files a false certified payroll with respect to the status of an employee who is performing manual labor on a public building construction project;
- (14) The statute provides the minimum standards required for the completion of a safety course by manual laborers on public construction contracts; any contractor can exceed these minimum requirements; and
- (15) Regulations clarifying the statute are currently in the regulatory process, and shall be posted on the CTDOL website as soon as they are adopted in final form.
- (16) Any questions regarding this statute may be directed to the Wage and Workplace Standards Division of the Connecticut Labor Department via the internet website of <http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm>; or by telephone at (860)263-6790.

THE ABOVE INFORMATION IS PROVIDED EXCLUSIVELY AS AN EDUCATIONAL RESOURCE, AND IS NOT INTENDED AS A SUBSTITUTE FOR LEGAL INTERPRETATIONS WHICH MAY ULTIMATELY ARISE CONCERNING THE CONSTRUCTION OF THE STATUTE OR THE REGULATIONS.

**Connecticut Department of Labor
Wage and Workplace Standards Division
FOOTNOTES**

⇒ Please Note: If the “Benefits” listed on the schedule for the following occupations includes a letter(s) (+ a or + a+b for instance), refer to the information below.

Benefits to be paid at the appropriate prevailing wage rate for the listed occupation.

If the “Benefits” section for the occupation lists only a dollar amount, disregard the information below.

**Bricklayers, Cement Masons, Cement Finishers, Concrete Finishers, Stone Masons
(Building Construction) and
(Residential- Hartford, Middlesex, New Haven, New London and Tolland Counties)**

- a. Paid Holiday: Employees shall receive 4 hours for Christmas Eve holiday provided the employee works the regularly scheduled day before and after the holiday. Employers may schedule work on Christmas Eve and employees shall receive pay for actual hours worked in addition to holiday pay.

Elevator Constructors: Mechanics

- a. Paid Holidays: New Year’s Day, Memorial Day, Independence Day, Labor Day, Veterans’ Day, Thanksgiving Day, Christmas Day, plus the Friday after Thanksgiving.
- b. Vacation: Employer contributes 8% of basic hourly rate for 5 years or more of service or 6% of basic hourly rate for 6 months to 5 years of service as vacation pay credit.

Glaziers

- a. Paid Holidays: Labor Day and Christmas Day.

**Power Equipment Operators
(Heavy and Highway Construction & Building Construction)**

- a. Paid Holidays: New Year’s Day, Good Friday, Memorial day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day, provided the employee works 3 days during the week in which the holiday falls, if scheduled, and if scheduled, the working day before and the working day after the holiday. Holidays falling on Saturday may be observed on Saturday, or if the employer so elects, on the preceding Friday.

Ironworkers

- a. Paid Holiday: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

Laborers (Tunnel Construction)

- a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. No employee shall be eligible for holiday pay when he fails, without cause, to work the regular work day preceding the holiday or the regular work day following the holiday.

Roofers

- a. Paid Holidays: July 4th, Labor Day, and Christmas Day provided the employee is employed 15 days prior to the holiday.

Sprinkler Fitters

- a. Paid Holidays: Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day, provided the employee has been in the employment of a contractor 20 working days prior to any such paid holiday.

Truck Drivers

(Heavy and Highway Construction & Building Construction)

- a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas day, and Good Friday, provided the employee has at least 31 calendar days of service and works the last scheduled day before and the first scheduled day after the holiday, unless excused.

STATUTE 31-55a

- SPECIAL NOTICE -

To: All State and Political Subdivisions, Their Agents, and Contractors

Connecticut General Statute 31-55a - Annual adjustments to wage rates by contractors doing state work.

Each contractor that is awarded a contract on or after October 1, 2002, for (1) the construction of a state highway or bridge that falls under the provisions of section 31-54 of the general statutes, or (2) the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project that falls under the provisions of section 31-53 of the general statutes shall contact the Labor Commissioner on or before July first of each year, for the duration of such contract, to ascertain the prevailing rate of wages on an hourly basis and the amount of payment or contributions paid or payable on behalf of each mechanic, laborer or worker employed upon the work contracted to be done, and shall make any necessary adjustments to such prevailing rate of wages and such payment or contributions paid or payable on behalf of each such employee, effective each July first.

- The prevailing wage rates applicable to any contract or subcontract awarded on or after October 1, 2002 are subject to annual adjustments each July 1st for the duration of any project which was originally advertised for bids on or after October 1, 2002.
- Each contractor affected by the above requirement shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.
- It is the **contractor's** responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's Web Site. The annual adjustments will be posted on the Department of Labor Web page: www.ctdol.state.ct.us. For those without internet access, please contact the division listed below.
- The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project. All subsequent annual adjustments will be posted on our Web Site for contractor access.

Any questions should be directed to the Contract Compliance Unit, Wage and Workplace Standards Division, Connecticut Department of Labor, 200 Folly Brook Blvd., Wethersfield, CT 06109 at (860)263-6790.

[New] In accordance with Section 31-53b(a) of the C.G.S. each contractor shall provide a copy of the OSHA 10 Hour Construction Safety and Health Card for each employee, to be attached to the first certified payroll on the project.

| PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS | | | | | | | | | | | | | | | | | | |
|---|-----------------------------------|------------------|-------------|-----------------------|--|---------------------------------|---|-----------------|---|------------------|---|---|----------------|--|------------------|---------------|--|---------------------|
| Connecticut Department of Labor Wage and Workplace Standards Division 200 Folly Brook Blvd. Wethersfield, CT 06109 | | | | | | | | | | | | | | | | | | |
| SUBCONTRACTOR NAME & ADDRESS | | | | | | | | | | | | WORKER'S COMPENSATION INSURANCE CARRIER | | | | | | |
| PROJECT NAME & ADDRESS | | | | | | | | | | | | POLICY # | | | | | | |
| WEEKLY PAYROLL | | | | | | | | | | | | EFFECTIVE DATE: | | EXPIRATION DATE: | | | | |
| PAYROLL NUMBER | PERSON/WORKER ADDRESS AND SECTION | Week-Ending Date | APPR RATE % | MALE/FEMALE AND RACE* | WORK CLASSIFICATION <small>Trade License Type & Number - OSHA 10 Certification Number</small> | DAY AND DATE | | | | | | | Total ST Hours | GROSS PAY FOR ALL WORK PERFORMED THIS WEEK | TOTAL DEDUCTIONS | | GROSS PAY FOR THIS PREVAILING RATE JOB | CHECK # AND NET PAY |
| | | | | | | S | M | T | W | TH | F | S | | | FICA | FEDERAL STATE | | |
| | | | | | | HOURS WORKED EACH DAY | | | | | | | | | | | | |
| | | | | | | Per Hour 1 through 6 (see back) | | | | | | | | | | | | |
| | | | | | | BASE HOURLY RATE | | FRINGE BENEFITS | | TYPE OF BENEFITS | | | | | | | | |
| | | | | | | CASH | | Per Hour | | 1 through 6 | | | | | | | | |
| | | | | | | CASH | | 1 through 6 | | (see back) | | | | | | | | |
| | | | | | | 1. \$ | | 2. \$ | | 3. \$ | | 4. \$ | | 5. \$ | | 6. \$ | | |
| | | | | | | Base Rate | | Cash Fringe | | | | | | | | | | |
| | | | | | | 1. \$ | | 2. \$ | | 3. \$ | | 4. \$ | | 5. \$ | | 6. \$ | | |
| | | | | | | Base Rate | | Cash Fringe | | | | | | | | | | |
| | | | | | | 1. \$ | | 2. \$ | | 3. \$ | | 4. \$ | | 5. \$ | | 6. \$ | | |
| | | | | | | Base Rate | | Cash Fringe | | | | | | | | | | |
| | | | | | | 1. \$ | | 2. \$ | | 3. \$ | | 4. \$ | | 5. \$ | | 6. \$ | | |
| | | | | | | Base Rate | | Cash Fringe | | | | | | | | | | |
| | | | | | | 1. \$ | | 2. \$ | | 3. \$ | | 4. \$ | | 5. \$ | | 6. \$ | | |
| | | | | | | Base Rate | | Cash Fringe | | | | | | | | | | |

*IF REQUIRED

*SEE REVERSE SIDE

PAGE NUMBER ____ OF ____

OSHA 10 ~ ATTACH CARD TO 1ST CERTIFIED PAYROLL

***FRINGE BENEFITS EXPLANATION (P):**

Bona fide benefits paid to approved plans, funds or programs, except those required by Federal or State Law (unemployment tax, worker’s compensation, income taxes, etc.).

Please specify the type of benefits provided:

- 1) Medical or hospital care _____
- 2) Pension or retirement _____
- 3) Life Insurance _____
- 4) Disability _____
- 5) Vacation, holiday _____
- 6) Other (please specify) _____

CERTIFIED STATEMENT OF COMPLIANCE

For the week ending date of _____,

I, _____ of _____, (hereafter known as

Employer) in my capacity as _____ (title) do hereby certify and state:

Section A:

1. All persons employed on said project have been paid the full weekly wages earned by them during the week in accordance with Connecticut General Statutes, section 31-53, as amended. Further, I hereby certify and state the following:

- a) The records submitted are true and accurate;
- b) The rate of wages paid to each mechanic, laborer or workman and the amount of payment or contributions paid or payable on behalf of each such person to any employee welfare fund, as defined in Connecticut General Statutes, section 31-53 (h), are not less than the prevailing rate of wages and the amount of payment or contributions paid or payable on behalf of each such person to any employee welfare fund, as determined by the Labor Commissioner pursuant to subsection Connecticut General Statutes, section 31-53 (d), and said wages and benefits are not less than those which may also be required by contract;
- c) The Employer has complied with all of the provisions in Connecticut General Statutes, section 31-53 (and Section 31-54 if applicable for state highway construction);
- d) Each such person is covered by a worker’s compensation insurance policy for the duration of his employment which proof of coverage has been provided to the contracting agency;
- e) The Employer does not receive kickbacks, which means any money, fee, commission, credit, gift, gratuity, thing of value, or compensation of any kind which is provided directly or indirectly, to any prime contractor, prime contractor employee, subcontractor, or subcontractor employee for the purpose of improperly obtaining or rewarding favorable treatment in connection with a prime contract or in connection with a prime contractor in connection with a subcontractor relating to a prime contractor; and
- f) The Employer is aware that filing a certified payroll which he knows to be false is a class D felony for which the employer may be fined up to five thousand dollars, imprisoned for up to five years or both.

2. OSHA~The employer shall affix a copy of the construction safety course, program or training completion document to the certified payroll required to be submitted to the contracting agency for this project on which such persons name first appears.

 (Signature) (Title) Submitted on (Date)

*****THIS IS A PUBLIC DOCUMENT***
DO NOT INCLUDE SOCIAL SECURITY NUMBERS**

Weekly Payroll Certification For
Public Works Projects (Continued)

Week-Ending Date:
Contractor or Subcontractor Business Name:

| PERSON/WORKER, ADDRESS and SECTION | APPR RATE % | MALE/ FEMALE AND RACE* | WORK CLASSIFICATION Trade License Type & Number - OSHA 10 Certification Number | DAY AND DATE | | | | | | | BASE HOURLY RATE | | TYPE OF FRINGE BENEFITS Per Hour 1 through 6 (see back) | GROSS PAY FOR ALL WORK PERFORMED THIS WEEK | TOTAL DEDUCTIONS | | | GROSS PAY FOR THIS PREVAILING RATE JOB | CHECK # AND NET PAY |
|---------------------------------------|-------------------|---------------------------------|--|-----------------------|---|---|---|----|---|---|------------------------------|----------|--|---|------------------|------------------|---------------|--|------------------------|
| | | | | S | M | T | W | TH | F | S | Total | OT Hours | | | FICA | WITH- HOLDING | LIST OTHER | | |
| | | | | HOURS WORKED EACH DAY | | | | | | | TOTAL FRINGE BENEFIT PLAN | CASH | | | WIT- HOLDING | WITH- HOLDING | | | |
| | | | | | | | | | | | \$ | 1. \$ | | | | | | | |
| | | | | | | | | | | | Base Rate | 2. \$ | | | | | | | |
| | | | | | | | | | | | \$ | 3. \$ | | | | | | | |
| | | | | | | | | | | | Cash Fringe | 4. \$ | | | | | | | |
| | | | | | | | | | | | | 5. \$ | | | | | | | |
| | | | | | | | | | | | Cash Fringe | 6. \$ | | | | | | | |
| | | | | | | | | | | | \$ | 1. \$ | | | | | | | |
| | | | | | | | | | | | Base Rate | 2. \$ | | | | | | | |
| | | | | | | | | | | | \$ | 3. \$ | | | | | | | |
| | | | | | | | | | | | Cash Fringe | 4. \$ | | | | | | | |
| | | | | | | | | | | | | 5. \$ | | | | | | | |
| | | | | | | | | | | | Cash Fringe | 6. \$ | | | | | | | |
| | | | | | | | | | | | \$ | 1. \$ | | | | | | | |
| | | | | | | | | | | | Base Rate | 2. \$ | | | | | | | |
| | | | | | | | | | | | \$ | 3. \$ | | | | | | | |
| | | | | | | | | | | | Cash Fringe | 4. \$ | | | | | | | |
| | | | | | | | | | | | | 5. \$ | | | | | | | |
| | | | | | | | | | | | Cash Fringe | 6. \$ | | | | | | | |
| | | | | | | | | | | | \$ | 1. \$ | | | | | | | |
| | | | | | | | | | | | Base Rate | 2. \$ | | | | | | | |
| | | | | | | | | | | | \$ | 3. \$ | | | | | | | |
| | | | | | | | | | | | Cash Fringe | 4. \$ | | | | | | | |
| | | | | | | | | | | | | 5. \$ | | | | | | | |
| | | | | | | | | | | | Cash Fringe | 6. \$ | | | | | | | |

*IF REQUIRED

**Additional Forms to Be Submitted
After Bond Commission Funding Approval**

DAS ● Construction Services ● Office of Legal Affairs, Policy, and Procurement

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PERFORMANCE BOND
Know All Men by These Presents

THAT [] of the
Town of [], County [] and
State of [], as Principal (hereinafter called the Principal),
and [], []

(Insert place of Business)

(a surety company authorized to transact business in the State Of Connecticut) as Surety(ies) (hereinafter called the Surety) are held and firmly bound unto the State of Connecticut (hereinafter called the Obligee) in the full penal sum of

[]

(\$ []) Dollars, lawful money of the United States, to be paid to said State of Connecticut, to the which payment well and truly to be made and done, the said Principal binds himself, his heirs, executors, administrators and assigns (or itself, its successors and assigns), and the said Surety (ies) binds itself, its successors and assigns jointly and severally firmly by these presents.

Signed, sealed and delivered this [] day of [] 20 [] .

THE CONDITION OF THIS OBLIGATION IS SUCH THAT

WHEREAS said Principal will enter into a certain written contract with said Obligee, to be dated-the

[] day of [] 20 [] , which written , as amended, contract shall provide for the following:

Project Title: []

Project Location: []

Contract Number: []

Project Number: []

which contract, including any hereafter made extension, modification or alteration thereof, together with all plans and specifications now made or which may hereafter be made in extension, modification or alteration thereof, is hereby referred to, incorporated in, and made a part of this bond as though herein fully set forth.

NOW, THEREFORE, if the said Principal shall well and truly keep, perform and execute all the undertaking, covenants, terms, conditions, and agreements of said contract, as it may be extended, modified or altered, and during the *period* of any guaranty required under the contract, according to its provisions on his or its part to be kept and performed or shall indemnify and reimburse the Obligee for any loss that it may suffer through the failure of the Principal to faithfully observe and perform each and every obligation and duty imposed upon the Principal by the said contract, as it may be extended, modified or altered, at the time and in the manner therein specified, then this obligation shall be null and void, otherwise it shall remain and be in full force and effect.

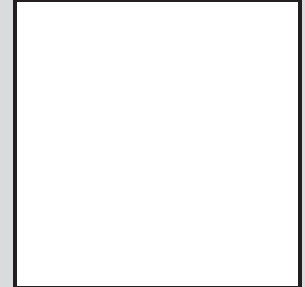
Any alterations which may be made in the terms of the contract, or in the work done or to be done under it, or the giving by the Obligee of any extension of time for the performance of the contract or any other forbearance on the part of either the Obligee or the Principal, one to the other, shall not in any way release the Principal, and/or the Surety(ies) or either of them, their representatives, heirs, executors, administrators, successors or assigns from liability hereunder, and notice to the Surety(ies) of any such alteration, modification, extension or forbearance is hereby specifically and absolutely waived.

In the event that the Surety(ies) assumes the contract or obtains a bid or bids for completion of the contract, the Surety(ies) shall ensure that the contractor chosen to complete the contract is prequalified pursuant to section 4a-100 of the Connecticut General Statutes, in the requisite classification and has the aggregate work capacity rating and single project limit necessary to complete the contract.

IN TESTIMONY WHEREOF, the said Principal has hereunto set his / its hand and seal, and the said Surety(ies) has/have caused this instrument to be signed by its/their attorney in fact and its corporate seal to be hereunto affixed, the day and year first written.

Witness as to Principle

SEAL



(Print Name)

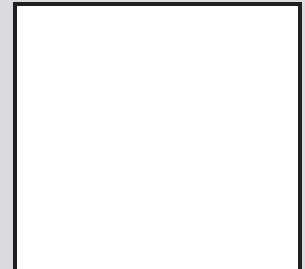
, Its

Duly Authorized

(Print Name)

Witness as to Surety

SEAL



(Print Name)

by

Its attorney in fact

(Print Name)

Note: If more than one surety, add additional lines for additional surety name and address, person signing and title, and two witnesses. Obtain Power of Attorney for each surety.

End Performance Bond

**LABOR AND MATERIAL BOND
Know All Men by These Presents**

THAT

[] of the
Town of [] , County [] and
State of [] , as Principal (hereinafter called the Principal),
and [] , []

(Insert place of Business)

(a surety company authorized to transact business in the State Of Connecticut) as Surety(ies) (hereinafter called the Surety) are held and firmly bound unto the State of Connecticut (hereinafter called the Obligee) in the full penal sum of

[]

(\$ []) Dollars, lawful money of the United States, to be paid to said State of Connecticut, to the which payment well and truly to be made and done, the said Principal binds himself, his heirs, executors, administrators and assigns (or itself, its successors and assigns), and the said Surety (ies) binds itself, its successors and assigns jointly and severally firmly by these presents.

Signed, sealed and delivered this [] day of [] 20 [] .

THE CONDITION OF THIS OBLIGATION IS SUCH THAT

WHEREAS said Principal will enter into a certain written contract with said Obligee, to be dated the

[] day of [] 20 [] , which written, as amended, contract shall provide for the following:

Project Title: []

Project Location: []

Contract Number: []

Project Number: []

which contract, including any hereafter made extension, modification or alteration thereof, together with all plans and specifications now made or which may hereafter be made in extension, modification or alteration thereof, is hereby referred to, incorporated in, and made a part of this bond as though herein fully set forth.

NOW, THEREFORE, if the said Principal shall promptly pay for all materials furnished and labor supplied or performed in the prosecution of the work included in and under the aforesaid contract, as it may be extended, modified or altered, and/or required by the General Statutes of Connecticut, as amended, whether or not the material or labor enters into and becomes a component part of the real asset, then this obligation shall be null and void, otherwise it shall remain and be in full force and effect. This bond is provided pursuant to Section 49-41 et seq. of the General Statutes of Connecticut and shall be governed thereby.

Any party, whether a subcontractor or otherwise, who furnishes materials or supplies or performs labor or services in the prosecution of the work under said contract, as it may be extended, modified or altered, and who is not paid therefor, may bring a suit on this bond in the name of the person suing and prosecute the same to final execution and judgment for such sum or sums as may be justly due.

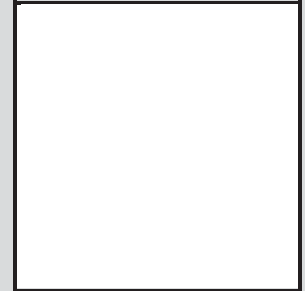
Any alterations which may be made in the terms of the contract, or in the work done or to be done under it, or the giving by the Obligee of any extension of time for the performance of the contract or any other forbearance on the part of either the Obligee or the Principal, one to the other, shall not in any way release the Principal, and/or the Surety(ies) or either of them, their representatives, heirs, executors, administrators, successors or assigns from liability hereunder, and notice to the Surety(ies) of any such alteration, modification, extension or forbearance is hereby specifically and absolutely waived.

In the event that the Surety(ies) assumes the contract or obtains a bid or bids for completion of the contract, the Surety(ies) shall ensure that the contractor chosen to complete the contract is prequalified pursuant to section 4a-100 of the Connecticut General Statutes, in the requisite classification and has the aggregate work capacity rating and single project limit necessary to complete the contract.

IN TESTIMONY WHEREOF, the said Principal has hereunto set his / its hand and seal, and the said Surety(ies) has/have caused this instrument to be signed by its/their attorney in fact and its corporate seal to be hereunto affixed, the day and year first written.

Witness as to Principle

SEAL



(Print Name)

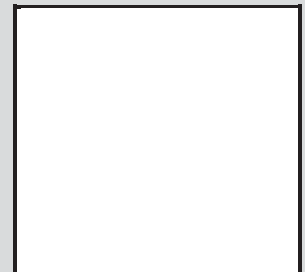
, Its

Duly Authorized

(Print Name)

Witness as to Surety

SEAL



(Print Name)

by

Its attorney in fact

(Print Name)

Note: If more than one surety, add additional lines for additional surety name and address, person signing and title, and two witnesses. Obtain Power of Attorney for each surety.

End Labor and Material Bond

Surety Sheet

State Of Connecticut
Department of Administrative Services, Construction Services
Office of Legal Affairs, Policy, and Procurement
450 Columbus Boulevard, Suite 1302
Hartford, CT 06103

1. Surety Company

Name of Surety Co.:

Address of Home Office:

Telephone Number:

2. Agent

Name of Surety Co.:

Address of Agency:

Telephone Number:

Attorney-In-Fact:

Telephone Number:

DAS Project Number:

Contractor's Name:

End Surety Sheet

**Bidder's Certification:
Financial Position and Corporate Structure**

(Your Name)

(Name Of Company)

Pursuant to C.G.S. § 4b-91(e), as amended, the bidder for this contract (hereinafter "bidder"), certifies under penalty of false statement that the information in the bid is true, that there has been no substantial change in the bidder's financial position or corporate structure since its most recent prequalification certificate was issued or renewed, other than those changes noted in the update statement, and that the bid was made without fraud or collusion with any person.

(Signature)

(Print Name)

(Date)

(DAS Project Number)

End Bidder's Certification: Financial Position and Corporate Structure

**End of Section 00 92 10
Additional Forms To Be Submitted After Bond Commission Funding Approval**

Procedures Regarding Taxation For Nonresident General / Prime Contractor and Subcontractors

DAS ● Construction Services ● Office of Legal Affairs, Policy, and Procurement

According to [Connecticut General Statutes § 12-430\(7\)](#), there are two types of Nonresident Contractors and Subcontractors (*Verified* or *Unverified*) who are required to furnish security for Connecticut taxes arising from jobs performed in Connecticut.

Detailed information can be found by visiting the Connecticut Department of Revenue Services (DRS) website at www.ct.gov/drs:

- Under the “**For Businesses**” title, click on “**Withholding Tax**”;
- Click on “**Registering**”;
- Click on “**5. What tax types do I need to register for with DRS**”;
- Read the information for “**Out-of-State**” contractors.
- Click on “[SN 2012\(2\)](#)” for the “Procedure Governing Nonresident Contractors”.

Forms can be downloaded from the DRS website (www.ct.gov/drs) as follows:

- Click on “**Forms**” at the top of the page;
- Under “**Current Year Forms**”:
 - Click on “**Miscellaneous Tax Forms**”;
 - Click on “**Bond Forms**”
- Download the appropriate form.

For questions regarding the nonresident contractor bond law, call **DRS** at **860-541-7538**.

1.0 Verified Nonresident Contractors and Subcontractors

Verified Nonresident Contractors are treated just like Resident Contractors. A Verified Nonresident General or Prime Contractor is not required to file a surety bond with DRS. A Verified Nonresident Subcontractor is not required for the General or Prime Contractor to hold back a portion of the amount owed the Subcontractor under the contract.

1.1 Verification Procedure for General/Prime Contractors and Subcontractors:

1.1.1 Register with DRS via REG-1 for all appropriate taxes.

1.1.2 Submit Form AU-960 “Nonresident Contractor Request for Verified Contractor Status” to DRS. If you have a 3 year filing history with DRS and no delinquencies, then just complete **Part I & Part I**, otherwise go to **Part III**.

1.1.3 Submit Form AU-961 “Verification Bond” to DRS.

1.1.4 If Verified by DRS, submit “**Notice of Verified Status**” (Verification Letter issued by DRS) to the Connecticut Department of Administrative Services / Construction Services (DAS/CS) Office of Legal Affairs, Policy, and Procurement as specified in Section 00 41 00 Bid Proposal Form.

**2.0 Unverified Nonresident Contractors and Subcontractors
(for Contracts Greater Than \$250,000):**

The requirements for Unverified Nonresident Contractors and Unverified Nonresident Subcontractors (for Contracts greater than \$250,000) are different for General/Prime Contractors and their Subcontractors:

2.1 Unverified Nonresident General or Prime Contractors:

- 2.1.1** Submit **Form AU-964 “Surety Bond and Release” to DRS**. The Unverified Nonresident General/Prime Contractor is required to file a good and valid surety bond with DRS using Form AU-964 “Surety Bond and Release” for 5% of the contract price to secure payment of required taxes by both the General/Prime Contractor and its Subcontractors.
- 2.1.2** The General/Prime Contractor must provide proof to DAS/CS that they have posted a good and valid surety bond with DRS by providing a copy of **Form AU-965 “Acceptance of Surety Bond”** that verifies acceptance of the bond by DRS*.

2.2 Unverified Nonresident Subcontractors:

- 2.2.1** The Resident or Verified or Unverified Nonresident General/Prime Contractor is required to hold back 5% of its payments to the Unverified Nonresident Subcontractor. The General/Prime Contractor must keep the hold-backs in a special fund in trust for the state.
- 2.2.2** The Unverified Nonresident Subcontractor can request that the money be released from the General/Prime Contractor by submitting **Form AU-967 “Request for Certificate of Compliance” to DRS**. It must be signed by the General/Prime Contractor and the Nonresident Subcontractor and submitted **to DRS within 90 days of the completion date**.
- 2.2.3** If **Form AU-968 “Certificate of Compliance”** is issued by DRS, DRS will instruct the General/Prime Contractor holding back the 5% to release the withheld amount to the Nonresident Subcontractor. If the “Certificate of Compliance” is denied or not requested within **90 days of the completion date of the contract**, the General/Prime Contractor holding back the 5% will remit the withheld amount on their own Sales & Use tax returns.
- 2.2.4** The 5% holdback does not take the place of any tax returns due from the Unverified Nonresident Contractor.
- 2.2.5** The General/Prime Contractor must give the Unverified Nonresident Subcontractor written notice of the hold-back requirements by the time the Subcontractor begins work under the contract.

*Document(s) must be submitted to the DAS/CS Office of Legal Affairs, Policy, and Procurement as specified in Section 00 41 00 “Bid Proposal Form”.

End of Section

**00 92 30 Procedures Regarding Taxation
For Nonresident General/Prime Contractor & Subcontractors**

PART 1 – GENERAL

1.1 DEFINITIONS

- A. Contractor:
Whenever the term "Contractor" is used in these Division 01 General Requirements and the Contract Documents, it may be understood to mean either the Design-Bid-Build (D-B-B) "General Contractor" or the Construction Manager at Risk ("CMR") as applicable to the specific Project.
- B. Contract:
Whenever the term "Contract" is used in these Division 01 General Requirements and the Contract Documents, it may be understood to mean either the D-B-B General Contractor's Contract Sum as stated in their Contract or the CMR's Contract Sum as stated in their CMR Agreement, as applicable to the specific Project.

1.2 RELATED DOCUMENTS

- A. The Contract Documents are defined in the D-B-B and CMR Division 00 General Conditions, as applicable to the specific Project.
- B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Delivery Method:
1. Design-Bid-Build (DBB);
 2. Construction Manager at Risk (CMR)
- B. Project Number: BI-T-615
- C. Project Title: DEEP West District Headquarters
- D. Project Location: The Black Rock State Park, located in Watertown, Connecticut.
- E. The Project Description:
1. Construction of an office building of approximately 14,508 gross square feet and a Garage and Shop Building of approximately 3,558 sf.
 2. The Office Building is planned to be LEED v4, Platinum and Net Zero.
 3. The office building is new and shall be constructed of materials that include but are not limited to the following: The structure shall consist of heavy timber (glulam) framing. Exterior wall construction shall consist of SIPS panels with composite and metal siding. Stone veneer is included at some areas. Roof construction shall consist of SIPS panels with a standing seam metal finish. Foundations shall consist of Concrete foundation walls and piers. Interior finishes include wood paneling, painted surfaces and glass walls. Floor coverings include polished concrete and carpet. Ceilings shall be painted GWB and acoustic panel systems.

The Garage and Shop building is a pre-engineered metal building with concrete foundations and masonry at the base of wall.
 4. The Authorities Having Jurisdiction for Threshold Projects, Non-Threshold Projects, and/or Connecticut State University System (CSUS) 2020 Projects, as defined by the Connecticut General Statutes, are the Connecticut Department of Administrative Services (DAS) / Construction Services (CS) Office of State Building Inspector (OSBI) and Office of State Fire Marshal (OSFM).
- F. Owner:
1. Owner's Name: The Owner is the State of Connecticut, Department of Administrative Services.
 2. Authorized Representative for the Owner: DAS/CS Project Manager Name: Ira Henowitz.
 - a. DAS/CS Project Manager's Location: The DAS/CS Project Manager is located at 450 Columbus Blvd, Suite 1201, Hartford, CT, 06103.
 - b. Phone: 860-713-5708

- c. Fax: 860-707-1987
 - d. Email(s): ira.henowitz@ct.gov
 3. Authority: The DAS/CS Project Manager is the only authorized representative for the Department of Administrative Services Commissioner to act in matters involving revoking, altering, enlarging or relaxing any requirement of the Contract Documents.
 - a. Related Section: Article 25, All Work Subject To Control of the Commissioner, Division 00 General Conditions of the Contract for Construction.
- G. Agency:
1. Agency Name: The Connecticut State (User) Agency is the Department of Energy and Environmental Protection (DEEP)
 2. Agency Representative Name and Title: Eric Ott The Agency Representative's Title is Director of Engineering and Field Support Services.
 - a. Agency Representative Location: The Agency Representative is located at Engineering and Field Support Services, Bureau of Central Services, Connecticut Department of Energy and Environmental Protection, 79 Elm Street, Hartford, CT 06106-5127
 - b. Phone: 860-424-4112
 - c. Fax: 860-344-2560
 - d. Email(s): eric.ott@ct.gov
 3. Authority: The Agency Representative has the administrative authority for the facility and or site where the work is being performed but does not have the authority to change the Contract Documents or direct the Contractor.
- H. Architect and Engineer (A/E):
1. Architect's Name: The Architect representing the firm for this project is Michael Fortuna, AIA
 - a. Architect's Location: The Architect is located at 92 West Main Street, Chester, CT
 - b. Phone: 860-526-9448
 - c. Fax: 860-526-9020
 - d. Email(s): mfortuna@tlbarchitecture.com
 2. The Architect and Engineer (A/E) or their accredited representative is referred to in the Contract Documents as "Architect" or "Architects" or "Engineer" or "Engineers" or by pronouns which imply them. As information for the Contractor, the Architect's or Engineer's status is defined as follows:
 - a. The Architect and Engineer will not make interpretations or decisions directly to the Contractor. All interpretations or decisions will be conveyed through the Construction Administrator to the DAS/CS Project Manager.
 - b. As the authorized representative of the Department of Administrative Services Commissioner, the Architect and Engineer is responsible for review of shop drawings, materials, and equipment intended for the work, in accordance with the Division 00 "General Conditions" and "Supplementary Conditions".
 3. Wherever the Architect or Engineer is mentioned in the documents in connection with an administrative function, it shall include the Construction Administrator in that function except for shop drawings.
- I. Construction Administrator (CA):
1. Construction Administrator Name: Atane Consulting
 - a. Construction Administrator Location: The Construction Administrator is located at 100 Great Meadow Road, Suite 400, Wethersfield, CT 06109.
 - b. Phone: 860-761-1001;
 - c. Fax: 860-422-4050
 - d. Email(s): rhewey@ataneconsulting.com
 2. Authority: As information to the Contractor, the Construction Administrator's status is defined as follows:
 - a. The Construction Administrator (CA) is referred to in the Contract Documents as "Construction Administrator" or by pronouns which imply it. All communications concerning the project will be directed through the Construction Administrator or a designated representative(s).

- b. The Construction Administrator is the Owner's Agent who will, among other things, monitor and analyze the Contractor's performance, scheduling and construction, process shop drawings, material, and equipment submittals, review and process periodic billings, review, analyze, and recommend cost changes.
 - c. Related Section: Article 26 "Authority of the Construction Administrator" of Division 00 "General Conditions of the Contract for Construction".
 - 3. The Construction Administrator will process all requests for information, interpretations and decisions regarding the meaning and intent of the Contract Documents, consulting with appropriate parties prior to rendering the interpretations or decisions for the Project Manager to the Contractor. All such requests and replies shall be in writing.
 - J. Construction Manager (CMR):
 - K. Work: The Work Includes but is not limited to the following:
 - 1 Site Construction, Landscaping, Site Utilities;
 - 2 Cast-in-Place Concrete;
 - 3 Masonry;
 - 4 Structural Steel, Miscellaneous Metals;
 - 5 Structural Insulating Panels, Glue-laminated Construction, Architectural Woodwork, Laminate Clad Casework;
 - 6 Waterproofing, Insulation, Firestopping, Roofing, Sheet metal, and Joint Sealants;
 - 7 Doors and Frames, Overhead Doors, Aluminum-Clad Wood Windows and Hardware
 - 8 Drywall, Floor Coverings, Acoustical Ceilings, and Painting;
 - 9 Toilet Compartments, Louvers and Vents, Wall Surface Protection Systems, Signage, Lockers, Fire Extinguishers, and Toilet Accessories;
 - 10 Laboratory Furnishings and Equipment;
 - 11 Window Treatments and Floor Mats;
 - 12 Elevator;
 - 13 Plumbing, Fire Protection, HVAC, and Controls;
 - 14 Electrical and Fire Alarm Systems; and
 - 15 Premanufactured Steel Building.
 - L. The Contractor will include in their bid, all items required in order to carry out the intent of the Work as described, shown and implied in the Contract Documents.
 - M. It shall be the Contractor's responsibility upon discovery to immediately notify the Construction Administrator, in writing, of errors, omissions, discrepancies, and instances of noncompliance with applicable codes and regulations within the documents, and of any work which will not fit or properly function if installed as indicated on the Contract Documents. Any additional costs arising from the Contractor's failure to provide such notification shall be borne by the Contractor.
 - N. The Work will be constructed under the Contractor's Contract as applicable to this Project.
 - O. The Work will be performed in accordance with the Connecticut Department of Energy and Environmental Protection's (DEEP) "General Permit for the Discharge of Stormwater and Dewatering Wastewater from Construction Activities" (DEEP-WPED-GP-015) and Stormwater Pollution Control Plan (SPCP), including, but not limited to, implementing, maintaining, and updating the SPCP, performing regular inspections, conducting and reporting stormwater monitoring activities, retaining records for the required period of time, and performing all post-construction measures and inspections. See Section 01 50 00 "Temporary Facilities and Controls" and Section 31 20 05 "Sedimentation and Erosion Control" for additional information.
- 1.4 WORK UNDER OTHER CONTRACTS
- A. Separate Contract: N/A
- 1.5 FUTURE WORK
- A. Future Contract: N/A

1.6 WORK SEQUENCE (PHASES)

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. The entire Project shall be constructed in one Phase. The Contractor shall prepare a sequence of operations that is consistent with the requirements of the Contract.
- C. Work in the Park associated with site utilities is required outside of the Work Limit Line. This work shall be scheduled and coordinated with DEEP, Waterbury Utilities and DOT to ensure operations are not interrupted. Contractor shall be responsible for protection of persons and property at all times during the Work of this Contract, both inside the Work Limit Line and beyond the Work Limit Line.

1.7 CONTRACTOR'S USE OF PREMISES

- A. General: During the construction period the Contractor shall have full use of the newly constructed premises for construction operations, including use of the site. The Contractor's use of the premises is limited only by the Owner's right to perform work or to retain other contractors on portions of the Project.
- B. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.
 - 1. Owner Occupancy: Allow for Owner occupancy and use by the public of the existing park outside the areas of Work.
 - 2. The Contractor shall confine his operations including storage of materials, supplies, equipment, and apparatus to the areas bounded by the contract limits indicated and as directed in the Contract Documents.
 - 3. Existing roads, drives, walks, and parking areas which are not within the contract limit line are to be kept free and clear at all times. All deliveries for the project are to enter the property from the main Park Entrance and shall traverse paved roads to the point of Construction site access. The Contractor shall check all roadways and parking areas for accessibility and clearances for deliveries of all large material and equipment. The Contractor shall inform the Construction Administrator at least seventy-two (72) hours in advance of these deliveries so they can be coordinated with the Agency so appropriate traffic control, etc. can be provided. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
 - 4. The Contractor shall be responsible for keeping the premises clean and shall pick up rubbish and debris and promptly remove from site.
 - 5. Parking for the Contractor's employees will be limited to an area designated by the Construction Administrator, and the Contractor may be required to provide identification stickers for all employees' cars.
 - 6. Special precautions shall be taken to protect all wetland areas designated to remain. Prevent any and all sediment, debris, or other materials from getting into these areas. Should any sediment, debris, or other materials get into these areas or if any damage occurs to the vegetation therein, the Contractor shall immediately contact the Construction Administrator for direction.
 - 7. The Contractor shall comply with local working hour restrictions, unless specifically approved otherwise in writing by the Owner.
 - 8. No signs, other than those approved by the Construction Administrator, will be visible on the premises.

1.8 OCCUPANCY REQUIREMENTS

- A. Full Agency Occupancy During Construction: N/A.
- B. Partial Agency Occupancy: The Owner reserves the right to allow the Agency to occupy and to place and install equipment in completed areas of the building prior to Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the total Work.
 - 1. Should it become necessary or advisable, as the work nears final completion, for the Agency to occupy a portion of the building prior to final acceptance, the Contractor shall cooperate in completing such areas and making same accessible.
 - 2. The Construction Administrator will determine whether such occupancy or use is possible and, if so, will make arrangements for holding a job inspection with the DAS/CS Project Manager, Agency Representative, and Contractor.

3. A comprehensive list of items to be completed or corrected as issued by the Contractor, together with the status of completion and terms of occupancy, will be forwarded to the DAS/CS Project Manager by the Construction Administrator. A letter will be issued by the DAS/CS Project Manager and Contractor to Construction Administrator granting such occupancy and will state the terms and conditions of occupancy.
 4. Prior to partial Agency occupancy, mechanical and electrical systems shall be fully operational. Required inspections and tests shall have been successfully completed. Upon occupancy, the Agency will operate and maintain mechanical and electrical systems serving occupied portions of the building.
 5. The Architect will prepare a "Certificate of Substantial Completion" for each specific portion of the Work to be occupied prior to Agency occupancy. Use the "Certificate of Substantial Completion" form as required by the Owner and forward the Certificate to the DAS/CS Office of State Building Inspector for a Certificate of Occupancy and obtain the same after his review and approval.
 6. The DAS/CS Project Manager will request a signed "Certificate of Compliance" from Commissioner of the Department of Administrative Services, Architect, and Contractor, if required.
 7. A letter from the DAS/CS Project Manager to the Agency Representative with copy to the Contractor granting occupancy will state the terms and conditions of occupancy and that fire insurance coverage has been requested, the effective date of which will indicate to the Contractor that they may cancel fire insurance coverage for that portion of the project.
 8. Upon occupancy, the Agency will assume responsibility for maintenance and custodial service for occupied portions of the building.
 9. Work after Partial Agency Occupancy:
 - 9.1 For all work to complete the area occupied, warranty work, the balancing and Commissioning (Cx) of systems, repair of latent defects and adjustments after partial occupancy, the Contractor is responsible for all costs associated with working in occupied buildings.
- C. Agency Occupancy:**
1. The Construction Administrator will determine whether such occupancy is possible and, if so, will make arrangements for holding a job inspection with the DAS/CS Project Manager, Agency Representative, and Contractor.
 2. A comprehensive list of items to be completed or corrected as issued by the Contractor, together with the status of completion and terms of occupancy, will be forwarded to the DAS/CS Project Manager and the Contractor by the Construction Administrator. A letter will be issued by the DAS/CS Project Manager and Contractor to Construction Administrator granting such occupancy and will state the terms and conditions of occupancy.
 3. Prior to Agency occupancy, mechanical and electrical systems shall be fully operational. Required inspections and tests shall have been successfully completed. Upon occupancy, the Agency will operate and maintain mechanical and electrical systems serving occupied portions of the building.
 4. The Architect will prepare a "Certificate of Substantial Completion" for the Work to be occupied prior to Agency occupancy. Use the "Certificate of Substantial Completion" form as required by the Owner.
 5. The DAS/CS Project Manager will request a signed "Certificate of Compliance" from Commissioner of the Department of Administrative Services, Architect, and Contractor, if required.
 6. A letter from the DAS/CS Project Manager to the Agency Representative with copy to the Contractor granting occupancy will state the terms and conditions of occupancy and that fire insurance coverage has been requested, the effective date of which will indicate to the Contractor that they may cancel fire insurance coverage for the project.
 7. Upon occupancy, the Agency will assume responsibility for maintenance and custodial service for occupied portions of the building.
 8. Work after Agency Occupancy:
 - 8.1 For all work to complete the occupied building, warranty work, the balancing and commissioning of systems, repair of latent defects and adjustments after occupancy, the Contractor is responsible for all costs associated with working in occupied buildings.

1.9 PRODUCTS ORDERED IN ADVANCE

- A. General: N/A.

1.10 OWNER-FURNISHED PRODUCTS

- A. The Owner shall furnish wood products as indicated in the construction documents. The Work includes providing support systems to receive Owner's material, make necessary modifications, fit, finish and install as required for a complete project, as described in the Contract Documents.
1. The Owner will arrange for and deliver necessary wood products to the Contractor.
 2. The Owner will arrange and pay for delivery of Owner-furnished items according to the Contractor's Construction Schedule. Delivery will be Freight-on-Board the Job Site. The Contractor will be responsible for off-loading of material, transport and storage, in addition to the work of the Contract to prepare, finish and install the wood products.
 3. Following delivery, the Owner will inspect items delivered for damage.
 4. If Owner-furnished items are damaged, defective, or missing, the Owner will arrange for replacement.
 5. The Contractor shall designate delivery dates of Owner-furnished items in the Contractor's Construction Schedule.
 6. The Contractor shall verify species and quantity of wood materials and shall notify the Architect of discrepancies or problems anticipated in use of the product.
 7. The Contractor is responsible for receiving, unloading, and handling Owner-furnished items at the site.
 8. The Contractor is responsible for protecting Owner-furnished items from damage, including damage from exposure to the elements. The Contractor shall repair or replace items damaged as a result of his operations.

1.11 MISCELLANEOUS PROVISIONS

A. Examination of Site:

1. It is not the intent of the Documents to show all existing conditions. All Contractors and Subcontractors are advised to attend the Pre-Bid Meeting prior to submitting their Bid Proposals. This is the only official opportunity to visit and examine the site with the Owner, Agency, Architect, Engineer and Construction Administrator.
2. The Contractor should investigate and satisfy himself as to the conditions affecting the work, including but not restricted to those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, uncertainties of weather, roads or similar physical conditions of the ground, the character of equipment, and facilities needed preliminary to and during the prosecution of the Work. The Contractor should further satisfy himself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, as well as from information presented by the Contract Documents. Any failure by the Contractor to acquaint himself with the available information shall not relieve him from the responsibility for estimating properly the difficulty and cost of successfully performing the Work.
6. Subsurface Geotechnical Investigations:
 - a. If Boring logs have been prepared for the site of this work they are in the Contract Documents.
 - b. If Geotechnical Reports(s) have been prepared for this project they are referenced in Section 00 30 00 Available Information and provided in Division 50 00 00 Project-Specific Available Information.
 - 1) The Contractor must interpret the Geotechnical Report (s) according to his own judgement and acknowledges that he is not relying upon the data as accurately describing the subsurface conditions which may be found to exist.
 - 2) The Contractor further acknowledges that he assumes all risk contingents upon the nature of the subsurface conditions, which shall be actually encountered by him in performing the Work of this Contract.
 - 3) The Contractor should visit the site and become acquainted with all existing conditions and may make their own subsurface investigations to satisfy themselves as to the subsurface conditions. Such investigations shall be conducted only under time schedules and arrangements approved in advance by the Owner.
7. No attempt has been made to locate hazardous material associated with existing site utilities, though it is presumed that at least some asbestos may be discovered associated with underground piping during the course of site and site utilities work. If and when such materials appear, the Contractor shall notify the Owner, who shall direct additional work outside of this Contract to assist in cutting up and disposing of

same. The Contractor shall assist the hazardous materials contractor(s) with excavating, heavy lifting, and the like at no additional cost to the Owner.

- B. Pre-Bid Meeting:
1. A Pre-Bid Meeting and tour of the site will be conducted as scheduled in Division 00 Section 00 11 16 "Invitation to Bid". This scheduled meeting is the only official opportunity for the bidders to tour the site with the Owner, Architect, Engineer, Construction Administrator, and Agency.
- C. Project Documents:
1. The Specifications and Drawings are intended to describe and illustrate the materials and labor necessary for the work of this Project.
 2. Throughout the Technical Specifications, the Connecticut Department of Transportation Standard Specifications for Roads, Bridges, and Incidental Construction Form 816, current edition including any interim and supplemental specifications are referenced. Where so referenced the requirements set forth therein are applicable and made a part hereof. Copies of Form 816 are available from the Connecticut Department of Transportation at a nominal charge.
- D. Site Logistics Plan(s): Site Logistics Plan(s) for this Project are in the Contract Documents. The Site Logistics Plan(s) describe in detail the proposed use of the Site and Building, both inside and outside the Contract Limit Area.
1. Related Section: Section 01 31 00 "Project Management and Coordination", 1.5 Submittals, A, (4).
 2. The Site Logistics Plan(s) include, but are not be limited to the following information:
 - a. Erosion and Sedimentation Control phasing requirements;
 - b. proposed vehicle and equipment access routes;
 - c. locations of proposed staging/lay-down and storage areas, utility connections;
 - d. delivery access of materials, handicap access;
 - e. office trailer and dumpster locations;
 - f. location of perimeter construction fencing and gates;
 - g. other protection measures around building(s);
 - h. proposed protection measures for trees, shrubs and plantings, interior access-ways;
- E. Scope Review:
1. Prior to signing a Contract with the State, DAS/CS will conduct a full scope review with the apparent Low Bidder to ensure that all of the requirements have been included within the bid. This scope review will highlight all of the specific requirements of the project, a review of the DAS/CS procedures and all of the Technical sections of the contract documents.
 2. This process will ensure that all of the scope of work included in the contract documents has indeed been included.
- F. Specifications, Drawings, and Electronic Data Storage Devices Furnished:
1. The Contractor shall receive one (1) set of Portable Document Format (PDF, latest version) Conformed Bid Documents (incorporating all Addendum changes made to the Contract Documents during the official Bid Period) on Electronic Data Storage Devices on or about the time of execution of the Contract, free of charge from the Architect. If additional copies are wanted, they will be available at the direct additional cost of their reproduction, to the Contractor.
 2. The Contractor shall receive one (1) set of AutoCAD compatible (latest version) Conformed Set of Floor Plans (incorporating all Addendum changes made to the Contract Documents during the official Bid Period) on Electronic Data Storage Devices at no cost on or about the time of execution of the Contract from the Architect. Additional sets of AutoCAD compatible (latest version) Floor Plans on Electronic Data Storage Devices from the Architect shall be available at the cost of their reproduction, to the Contractor.
- G. Construction Responsibility:
1. The Contractor shall be responsible for his construction means, methods, techniques, sequences, and procedures employed in the performance of his work and shall have full responsibility for his failure to carry out any part of his work in accordance with the Contract Documents.
- H. The Contractor shall request approval from the Owner to work overtime. Said request shall be made forty eight (48) hours in advance. All costs for overtime are included in the Contract Sum as stated in Division 00 Section 00 41 00 "Bid Proposal Form."
- I. PMWeb Project Management:

1. DAS/CS is using PMWeb as the project management collaborative software tool for this project.
 2. The Contractor is required to utilize PMWeb for the duration of this project and shall provide all project information via this program management software. This includes, but is not limited to contracts, applications for payment, change orders, change order proposals, requests for information, etc.
 3. The DAS/CS Project Manager or the Construction Administrator (CA) shall arrange for training. This training is for the Contractor's Staff, the DAS/CS Project Manager, the Construction Administrator, the A/E, and their representatives.
 4. DAS/CS will be establishing a project specific email "file" address for this project. The Contractor shall send an electronic "file" copy of all project documents to this email address, to include but not limited to all project correspondence, project emails, forms, etc.
 5. The Contractor is required to scan all documents that contain wet (ink) signatures and send a copy of those documents electronically to the DAS/CS Project Manager and the project specific email "file" address. The hard copy of the wet signature documents shall be transmitted as directed by the DAS/CS Project Manager. This includes, but is not limited to all contracts, change orders, applications for payment, closeout documentation, etc.
- J. Pursuant to C.G.S. Sec. 4a-101, the Contractor shall compile evaluation information during the performance of the contract on each of its subcontractors who are performing work with a value in excess of five hundred thousand dollars (\$500,000.00). The Contractor shall complete and submit to DAS/CS evaluations of each such subcontractor upon fifty percent (50%) completion of the project and upon Substantial Completion of the project. The Contractor acknowledges that its failure to complete and submit these evaluations in a timely manner may, by statute, result in a delay in project funding and, consequently, payment to the Contractor. The Contractor agrees to indemnify and hold the State harmless from any loss, damage, or expense that results from or is caused by the Contractor's failure to complete and submit the evaluations to DAS/CS in accordance with this provision.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 11 00

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Contract Documents and general provisions of the Contract, including General and Supplementary Conditions, other Division 01 Specification Sections, and Section 00 41 00 "Bid Proposal Form" apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Allowances.
 - 2. Unit Prices.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - Section 01 23 13 Supplemental Bids
 - Section 01 26 00 Contract Modification Procedures
 - Section 01 29 76 Progress Payment Procedures
 - Section 01 77 00 Closeout Procedures
 - Section 23 07 00 Thermal Insulation Specifications
 - Section 23 33 00 Sound Attenuators
 - Section 31 10 00 Site Clearing
 - Section 31 20 00 Site Earth Moving
 - Section 31 10 00 Exterior Water Utilities
 - Section 33 32 00 Exterior Sanitary Sewer Utilities
 - Section 31 25 13 Erosion and Sedimentation Control

1.3 ALLOWANCES

- A. This Contract includes no Allowances.

1.4 DEFINED UNIT PRICES - GENERAL

- A. This Section includes administrative and procedural requirements for unit prices.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section 01 26 00 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
 - 2. Division 01 Section 01 29 76 "Progress Payment Procedures" for procedures for submitting Application for Payments.
- C. Definition - Unit Price: Amount the Contractor acknowledges in the Bid Proposal Form as a price per unit of measurement for materials or services as described in the Contract Documents.
- D. Procedures:
 - 1. Unit Prices included in the Contract Documents are to be used for determining compensation to the Contractor or Owner for changes to the scope of the work indicated in the Contract Documents, and included in the Lump Sum Contract Price. Special Unit Prices are for items complete, in place, and shall be inclusive of furnishing and installing of all material, labor, trucking, overhead, profit, equipment, hoisting, excavation, stockpiling, loading, engineering, scaffolding, power hookups, protection, shop drawings, taxes, permits, appliances, delivery, disposal, insurance, supervision, cost of bond, etc. and shall remain in effect until completion of the Contract.
 - 2. Unit Price: Is identified by the Owner as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if the estimated quantities of Work required by the Contract Documents are increased or decreased.

3. Increases or Decreases: Should the amount of the Work required be increased or decreased because of changes in the work ordered in writing by the DAS/CS Project Manager, the Contractor agrees that the following supplemental UNIT PRICES will be decreased 10% for a reduction of work. Each Unit Price shall include all equipment, tools, labor, permits, fees, etc., incidental to the completion of the work involved. All items marked with an asterisk (*) in the unit price schedules shall include the completion of the excavation, formation and compaction of sub-grade and the disposal of surplus or unsuitable materials in accordance with the Plans and Specifications or as directed by the Construction Administrator.
4. The Owner reserves the right to reject the Contractor's measurement of work-in-place that involves use of established unit prices, and to have this work measured, at the Owner's expense, by an independent surveyor acceptable to the Contractor.
5. Defect Assessment: Replace the Work, or portions of the Work, not conforming to the specified requirements. If, in the opinion of the Architect/Engineer, it is not practical to remove and replace the work the Architect/Engineer will direct an appropriate remedy or adjust the payment.
6. Unit Price Schedules: "Unit Price Schedules" are included in this Section. Specification Sections referenced in the Schedule sections contain requirements for materials described under each unit price.

1.5 UNIT PRICE SCHEDULES

- A. Unit Price Schedule - Earth and Rock Excavation: This Section includes administrative and procedural requirements for the following unit prices and provisions that are to be included in and become part of this Contract to be used in evaluating additions to or deductions from the work called for in the specifications and/or plans.
1. Unless otherwise specified elsewhere in these documents, Contractors are to assume that all excavation is earth; however, if unspecified rock is encountered, it will be paid for at the given unit prices listed in Paragraph "C". Rock prices are net in that allowances for reduced quantities of earth are also included in the unit prices. The prices given include all costs for overhead, profit and rock surveys.
 2. Wherever rock to be excavated is encountered, the Contractor shall strip or expose the rock to such an extent that in the Owner's opinion the necessary measurements can be taken. The Contractor shall provide the Owner with a survey by a licensed land surveyor indicating top of rock elevations at points of intersection on a rectilinear grid with lines spaced sufficiently close to show accurately the rock surface contours. At the Owner's option, an additional survey may be furnished by the Owner from a licensed surveyor.
 3. If the conditions of the excavation work indicated are clearly of a special nature, the Contractor may ask the Owner for reconsideration of the established unit prices and if granted, the unit prices will not apply, and prices will be negotiated in accordance with Article 13 of the General Conditions.
- B. Definitions:
1. "EARTH" - is defined as excavation and shall include removal of all materials other than 'water' and 'rock'.
 2. "ROCK" - is defined as a boulder of one cubic yard or more in volume (1/2 cubic yard for a boulder in trenches), rock in definite ledge formation, and masonry structures of one cubic yard or more in volume, the removal of which requires the use of mechanical equipment or the use of explosives. Rock removed by scarification or ripping method is considered as a separate classification under Paragraph 4.c.1.0.
 3. "ORIGINAL GRADE" - is defined as being the grade which exists at the time of Contract Award.
 4. "ROUGH GRADE" - is defined as being the completed surface of required excavations greater than 13' in width.
 5. "MASS" - excavation is to be considered as an open area whose minimum horizontal dimensions exceed 13'.
 6. "TRENCH" - is defined as excavation is defined as the removal of material from areas 13 feet or less in its minimal horizontal dimensions and below the elevation of rough grade or original grade, whichever is lower.
- C. Procedures:
1. Rock Excavation in Trenches: Basis for Horizontal Measurement:
 - a. Horizontal Measurements: Will be taken between the vertical planes as defined below.
 - b. The Minimum Width of Trenches in Rock: Will be taken as 3' 0".
 - c. Excavation For Walls Or Piers With Footings: The measurements will be taken parallel to and one foot outside of the edges of the concrete footings as called for in the plans (i.e. for 4' 0" footing, rock will be taken as 6' 0" in width).

- d. Excavation For Walls Or Piers Without Footings: The limits of the excavation will be 1' 6" outside of the line of concrete at bottom as shown or called for in the plans (i.e. for a wall with a bottom thickness of 1' 0", the width of the trench will be considered to be 4' 0"). (Caissons are excluded from these measurements).
 - e. Excavation for Pipe Lines: Will be measured at 2' 0" more than the nominal inside diameter of the pipe but in no case less than 3' 0" wide.
 - f. Excavation For Tanks, Vaults, Manholes, Pits, Etc.: Will be measured as 2' 0" greater in both length and width or diameter than the actual exterior dimensions of the structures and this excavation is considered to be trench only if any measured horizontal dimensions is 13' or less.
 - g. No allowance will be made for rock removed beyond the above limits.
2. Rock Excavation in Trenches - Basis for Vertical Measurement:
- a. To determine depth of trench, vertical measurements will be taken from original grade or rough grade, (whichever is applicable), to the bottom of required excavation. These measurements will define the maximum depths for payments.
 - b. To determine quantity of rock in trench, vertical measurements will be taken from the top of rock as encountered in the trench to 12" below the bottom of required rock excavation. Any over excavation below the required elevation shall be filled with concrete or other material as specified at no cost to the Owner.
 - c. No allowance will be made for rock removed beyond the above limits.
3. Earth Excavation in Trenches - Basis of Measurement: (Horizontal & Vertical): The basis of measurements and allowance limit for earth excavation in trenches is identical to that indicated for rock excavation in trenches, except that there will be no allowance for 12" below the required elevation. In addition the following will prevail:
- a. Maximum allowable widths for earth excavation in trenches without shoring:

| Trench Depth - Classification | Add To Nominal ID Of Pipe Or To Footing Width |
|---|---|
| 0 ft. - 6 ft. | 3 ft. |
| Over 6 ft. - 10 ft. | 5 ft. |
| Over 10 ft. - 15 ft. | 7 ft. |
| Below 15 ft. deep the width of the trench shall be based on the individual case. The final depth of trench will determine the actual width for payment. | |

- b. If shoring is required the measurement shall be taken between the exterior walls of the shoring not to exceed 4' plus the I.D. of the pipe (for all depths).
 - c. To determine quantity of earth in trench, vertical measurements will be taken from the original or rough grade to actual bottom of earth excavation required.
4. Unit Prices - Earth and Rock Excavation (Basis for Payment): Prices include backfill with excavated material if it is suitable. Prices also include all excavation and disposal of all surplus or unsuitable material. Where replacement with the excavated material is prohibited or a particular backfill material is specified, the cost of the delivered replacement material in a volume equal to the above excavation pay limits minus the volume of the items installed in the trench shall be paid for at a prior negotiated price. Prices do not include costs of shoring and de-watering but do include sloping for sides of excavation. Payment and credit amounts shall be determined in the following manner: Widths and depths of trench excavation as indicated. The total quantity of earth or rock excavation encountered in each depth payment category shall be paid for at its respective unit price as shown below. For example, in a 15' trench excavated by machine, the first 6' will be paid for at the 0' - 6' price; the next 4' will be paid for at the over 6' - 10' price and the next 5' will be paid for at the over 10' - 15' price. Thus three different price brackets will prevail.

| | | | | |
|-----|-----------------------------|---|--------|-----------|
| a. | EARTH EXCAVATION - HAND | UNIT | \$ ADD | \$ DEDUCT |
| 1.0 | In Trenches (0' - 6' deep) | C.Y. | 36.00 | 28.80 |
| 2.0 | In Trenches (below 6' deep) | Prices Must Be Negotiated Before Work Is Started. | | |
| b. | EARTH EXCAVATION - MACHINE | UNIT | \$ ADD | \$ DEDUCT |
| 1.0 | Open Area (All Depths) | C.Y. | 18.81 | 15.05 |
| 2.0 | In Trenches: | | | |
| 2.1 | In trenches (0' - 6' deep) | C.Y. | 14.27 | 11.40 |

| | | | | | |
|-----|---|---|---|---------------|------------------|
| | 2.2 | In trenches (6' - 10' deep) | C.Y. | 19.71 | 15.75 |
| | 2.3 | In trenches (10' - 15' deep) | C.Y. | 35.00 | 28.00 |
| | 2.4 | In trenches (15' - 20' deep) | C.Y. | 75.00 | 60.00 |
| c. | ROCK EXCAVATION | | UNIT | \$ ADD | \$ DEDUCT |
| 1.0 | Open Areas, Rock Removed By Ripping (Any Amount) – Net Rock | | C.Y. | 103.50 | 82.80 |
| 2.0 | Open Areas, With Explosives: | | | | |
| | 2.1 | Net Rock (Total Quantity Up To 100) | C.Y. | 126.00 | 100.80 |
| | 2.2 | Net Rock (Total Quantity Up To 1,000) | C.Y. | 60.00 | 48.00 |
| | 2.3 | Net Rock (Total Quantity More Than 1,000) | C.Y. | 28.00 | 22.40 |
| 3.0 | In Trenches, Boulders, Remove By Machine | | C.Y. | 45.00 | 36.00 |
| 4.0 | In Trenches, Ripping Of Rock By Machine | | C.Y. | 105.00 | 84.00 |
| 5.0 | In Trenches, With Explosives: | | | | |
| | 5.1 | Net Rock (0' - 4' Deep) | C.Y. | 95.60 | 76.50 |
| | 5.2 | Net Rock (4' - 10' Deep) | C.Y. | 125.00 | 100.00 |
| | 5.3 | Net Rock (10' - 15' Deep) | C.Y. | 150.00 | 120.00 |
| | 5.4 | Net Rock (15' - 20' Deep) | C.Y. | 200.00 | 160.00 |
| | 5.5 | Net Rock (Over 20' Deep) | Prices Must Be Negotiated Before Work Is Started. | | |
| 6.0 | Jack Holes (For Hydraulic Lift/Elevators) | | L.F. | 95.00 | 76.00 |
| 7.0 | Open Or Mass Areas (If Explosives Are Prohibited): Net Rock | | C.Y. | 125.00 | 100.00 |
| 8.0 | Trench Excavation With Rock Splitters and Jack Hammer or Hoe Ram (If Explosives Are Prohibited): Net Rock | | C.Y. | 150.00 | 120.00 |

D. Unit Price Schedule – Miscellaneous Items:

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Unit Price Schedule – Miscellaneous Items:

| 1. Unit Price Schedule – Miscellaneous Items | | | | | |
|--|------------------|-------------------|---------------------|-------------------|----------------------|
| Section Number &/or Drawing Number | Item Description | Base Bid Quantity | Unit of Measurement | \$ Add Unit Price | \$ Deduct Unit Price |
| Drawing B1.0 | Structural fill | As Shown] | CY | \$ 36.00 | \$ 30.60 |
| C and L Drawings | Clean Fill | As Shown | CY | \$ 32.0 | \$ 27.20 |
| | | | | | |
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| | | | | | |

- 2. The Add/Deduct Unit Prices shown in the table above are a price per unit measurement for materials, services, or work added to or deducted from the Contract Sum by appropriate modification if the Base Bid Quantities of the Work listed in the above Schedule and described in the corresponding Section and/or Drawing are increased or decreased.
- 3. The Base Bid Quantities for each type of Work listed in the above Schedule and described in the corresponding Section shall be included in the Lump Sum Bid.
- 4. Unit Prices shall be negotiated if there is a change in scope of work.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 20 00

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements governing Supplemental Bids.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 00 Section 00 41 00 Bid Proposal Form
 - 2. Division 01 Section 01 20 00 Contract Considerations
 - 3. Division 01 Section 01 33 00 Submittal Procedures
 - 4. Division 01 Section 01 60 00 Product Requirements
 - 5. Section 102239 "Folding Panel Partitions"

1.3 DEFINITIONS

- A. Definition: "The monetary value stated in the Bid to be added to the amount of the Base Bid if the corresponding Work, as described in the Bidding Documents, is accepted." A Supplemental Bid is an amount proposed by bidders and stated on the Bid Proposal Form for certain work defined in the Bidding Documents that may be added to the Base Bid amount if the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. The cost for each supplemental bid is the net addition to the Contract Sum to incorporate the Supplemental Bid into the Work. Supplemental Bids are only accepted in the numerical order that they are listed on the Bid Proposal Form and never accepted out of numerical sequence. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent Work as necessary to completely and fully integrate that Work into the Project.
 - 1. Include as part of each Supplemental Bid, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not mentioned as part of the Supplemental Bid.
 - 2. Consider all work that must be accomplished for complete incorporation of the Supplemental Bids including modifications to Base Bid items.
 - 3. Include in lump sum prices for Supplemental Bids all costs of labor, materials, equipment, permits, fees, insurance, bonds, overhead, and profit.
 - 4. Immediately after award of Contract, advise all necessary subcontractors, vendors, and suppliers as to which Supplemental Bids have been selected by Owner. Use all means necessary to alert those subcontractors, vendors, and suppliers involved as to all changes in the work caused by Owner's selection or rejection of Supplemental Bids.
 - 5. Coordinate related work and modify surrounding work to integrate work of each Supplemental Bid.
- B. Execute accepted Supplemental Bids under the same conditions as other Work of this Contract.
- C. Schedule: A "Schedule of Supplemental Bids" is included at the end of this Section. It contains all of Specification Sections, and applicable portions of Drawings and Details that govern the scope, quality, and execution of work that is referenced in the Schedule and contain all of the requirements necessary to achieve the Work described under each Supplemental Bid.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 SCHEDULE OF SUPPLEMENTAL BIDS

- A.** Supplemental Bid No. 1: Requires the provision of a folding partition in the Training Room
 - a. Refer to Contract Documents for requirements, including but not limited to folding partition, structure and finishes.

- B.** Supplemental Bid No. 2: Requires the construction of a Picnic Pavilion
 - a. Refer to Contract Documents for requirements, including, but not limited to concrete foundation, glulam frame, wood deck, metal roof and associated sitework.

- C.** Supplemental Bid No. 3: Requires the provision of two Solar Car Changing Stations
 - a. Each Car Charging Station to be equivalent to Envision Solar EV Arc
 - b. Performance Characteristics:
 - i. 4.3kW solar array
 - ii. Daily range Delivered: up to 225
 - iii. Total battery Storage: 40 kW
 - iv. Total EV Charger Power: 4.2kW
 - v. Operating Temperature: -4 – 122 degrees F
 - vi. Certified Wind Load: 110 mph
 - c. Mechanical Characteristics:
 - i. Canopy Dimensions: 20'-6" x 10'-6"
 - ii. Maximum Height: 14'-6"
 - iii. Minimum Clearance: 7'-8"
 - iv. Basepad Footprint: 18'-0" x 7'-6"
 - v. Weight: <10,000 pounds
 - d. EV Charging Circuits: Provide (2) (J1772)

END OF SECTION 01 23 13

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A.** Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A.** This Section includes administrative and procedural requirements for handling requests for equals and substitutions made after award of the Contract.
- B.** Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section 01 33 00 "Submittal Procedures" specifies requirements for submitting the Contractor's Construction Schedule and the Submittal Schedule.
 - 2. Division 01 Section 01 42 20 "Reference Standards and Definitions" specifies the applicability of industry standards to products specified.
 - 3. Division 01 Section 01 60 00 "Product Requirements" specifies requirements governing the Contractor's selection of products and product options.

1.3 DEFINITIONS

- A.** Definitions in this Article do not change or modify the meaning of other terms used in the Contract Documents.
- B.** Equals or Substitutions General: Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract.

1.4 SUBMITTALS

- A.** Equals and Substitution Request Submittals: The Owner will consider requests for equals or substitutions if made prior to the Receipt of the Competitive Bid. The information on all materials shall be consistent with the information herein. After the contract award, substitutions will be considered for materials or systems specified that are no longer available. It will not be considered if the product was not purchased in a reasonable time after award. The Contractor shall submit all equal and substitutions requests on the "Equal or Substitute Product Request (Form 7001)", an example of which is shown at the end of this Section. The Form is available from the Construction Administrator (CA). See Article 15 in the General Conditions for further refinement and information.
- B.** The Contractor is required to prepare and submit three (3) copies of the required data for the first manufacturer listed or procedure listed in the specifications section with reference to all of the following areas: the substance and function considering quality, workmanship, economy of operation, durability and suitability for purposes intended including the size, rating performance, LEED® compliance, and cost. All submissions must include all the required data for the first listed manufacturer or procedure as specified, as well as the required data for the proposed Equal or Substitution. This will enable the Owner and Architect to determine that the proposed Equal or Substitution is or is not substantially equal to the first listed manufacturer or procedure.
 - 1. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.
 - 2. Provide complete documentation showing compliance with the requirements for equals or substitutions, and the following information, as appropriate:
 - a.** Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate contractors that will be necessary to accommodate the proposed Equal or Substitution.
 - b.** A detailed comparison chart of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.
 - c.** Product Data, including Shop Drawings and descriptions of products and fabrication and installation procedures.
 - d.** Samples, where applicable or requested.
 - e.** A statement indicating the effect on the Contractor's Construction Schedule or CPM Schedule compared to the schedule without approval of the Equal or Substitution. Indicate the effect on overall Contract Time.

- f. Cost information, broken down, including a proposal of the net change, if any in the Contract Sum.
 - g. The Contractor's certification that the proposed Equal or Substitution conforms to requirements in the Contract Documents in every respect and is appropriate for the applications indicated.
 - h. The Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the Equal or Substitution to perform adequately.
3. Architect's Action: If necessary, the Architect will request additional information or documentation for evaluation within seven (7) days of receipt of the original request for equal or substitution request. The Architect will notify the Construction Administrator who will notify the Owner of recommended acceptance or rejection of the proposed equal or substitution, within fourteen (14) days of receipt of the request, or seven (7) days of receipt of additional information or documentation, whichever is later. The Construction Administrator will give final acceptance or rejection by the Owner not less than seven (7) days after notification.
- a. Any request deemed an "Equal" and accepted by the Construction Administrator, Architect, Owner, and Agency will result in written notification to the Contractor and will not be in the form of a change order for an "Equal".
 - b. Any request deemed a "Substitution" and rejected or approved by Construction Administrator, Architect, and Owner may result in written notification to the Contractor and may be in the form of a change order if the "Substitution" is approved.

PART 2 - PRODUCTS

2.1 EQUAL OR SUBSTITUTIONS

- A. Conditions: The Architect will consider the Contractor's request for Equal or Substitution of a product or method of construction when one or more of the following conditions are satisfied, as determined by the Architect. If the following conditions are not satisfied, the Architect will return the requests to the Construction Administrator without action except to record noncompliance with these requirements.
- 1. The proposed request does not require extensive revisions to the Contract Documents.
 - 2. The proposed request is in accordance with the general intent of the Contract Documents.
 - 3. The proposed request is timely, fully documented, and/or properly submitted.
 - 4. The proposed request can be provided within the Contract Time. However, the Architect will not consider the proposed request if it is a result of the Contractor's failure to pursue the Work promptly or coordinate activities properly.
 - 5. The proposed request will offer the Owner a substantial advantage, in cost, time, energy conservation, or other considerations, after deducting additional responsibilities the Owner must assume. However, if the proposed request requires the Owner to incur additional responsibilities, including but not limited to, additional compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner or similar considerations, then the Owner will have just cause to reject the request for Equal or Substitution.
 - 6. The proposed request can receive the necessary approvals, in a timely manner, required by governing authorities having jurisdiction.
 - 7. The proposed request can be provided in a manner that is compatible with the Work as certified by the Contractor.
 - 8. The proposed request can be coordinated with the Work as certified by the Contractor.
 - 9. The proposed request can uphold the warranties required by the Contract Documents as certified by the Contractor.
- B. The Contractor's submission and the Architect's review of Submittals, including but not limited to, Samples, Manufacturer's Data, Shop Drawings, or other such items, which are not clearly identified as a request for an Equal or Substitution, will not be considered or accepted as a valid request for an Equal or Substitution, nor does it constitute an approval.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 25 00



**7001
Equal or Substitute
Product Request**

Page 1 of 2

Request Phase: Pre-Bid Post Bid (See Article 15 Materials: Standards, General Conditions)

(If Pre-bid only) Current Bid Due Date: Request No.: Dated:

To: State of Connecticut
Department of Administrative Services,
Construction Services

DAS Project No.:

Project Name / Location:

References: Specification(s): Section(s): Paragraph(s):

Drawing(s): Drawing(s) No(s): Detail(s) No(s):

Contractually Specified Product:

Contractor Proposed Product:

Proposed Product is: Equal: Substitute: Model No.:

IMPORTANT:
**See Attached Data For Both Specified And Proposed Products
As Required By Article 15 General Conditions.**

Data attached: Drawings: Product Data: Reports: Samples:

Tests: Other:

Reason(s) for not providing the Specified Product:

Similar Installation:

Project Name: Architect's Name:

Project Location: Owner's Name:

Date Installed:



7001
Equal or Substitute
Product Request

Page 2 of 2

Will proposed substitution impact other parts of the Work? No Yes *If Yes Attach An Explanation.*

Will proposed substitution increase Contract Time? No Yes *By Number Of Calendar Days*

Actual Dollar Savings to the State of Connecticut if substitution is accepted: \$

The Undersigned Certifies:
That The Proposed Request For An Equal Or Substitute Product Conforms To All Of The Requirements Of Division 01 General Requirements, Section 01 25 00 Substitution Procedures.

Request Submitted By General Contractor / CMR:
(Firm's Typed Name)

By:
(Typed Name) (Title) (Signature) (Date)

Contractor / CMR Send copies to : DAS PM: CA:

Consultant's Request Received on (Date):

Consultant's Review – This Substitution Request is:

Approved: *(Submittal(s) in accordance with Div. 01 General Requirements, Section 01 33 00 Submittal Procedures.)*

Approved as Noted: *(Submittals in accordance with Div. 01 General Requirements, Section 01 33 00 Submittal Procedures.)*

Rejected: Use Specified Materials.

Rejected: Request Not Received Within Specified Time Period - Use Specified Materials.

Reviewed Issued By:

Name:
(Typed Name)

Title:

Signature:
(Signature) (Date)

CONSULTANT Send copies to: DAS PM CA Chief Architect Chief Engineer

If Approved: As noted by Consultant,
DAS Chief Architect:
(Signature) (Date)

Copies: Project File Red R2

END

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing contract modifications.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
1. Division 01 Section 01 20 00 "Contract Considerations" for administrative requirements governing use of Unit Prices.
 2. Division 01 Section 01 25 00 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after award of the Contract.
 3. Division 01 Section 01 29 76 "Progress Payment Procedures" for administrative procedures governing Applications for Payment.
 4. Division 01 Section 01 32 16 "Construction Progress Schedules" for requirements for construction scheduling and reporting progress of work.
 5. Division 01 Section 01 33 00 "Submittal Procedures" for requirements for submittal of the Construction Progress Schedule or CPM Schedule.
 6. General Conditions "Article 13 - Compensation for Changes in the Work".
- C. All Forms referenced in this Section are available for download from the DAS website (www.ct.gov/DAS)> Doing Business With The State > State Building Construction > Publications and Forms > DAS Construction Services Library > 7000 Series - Construction Phase Forms.

1.3 REQUESTS FOR INFORMATION

- A. In the event that the Contractor or subcontractor, at any tier, determines that some portion of the drawings, specifications, or other contract documents requires clarification or interpretation by the Architect, the Contractor shall submit a "Request for Information" in writing to the Architect via the Construction Administrator. "Requests for Information" may only be submitted by the Contractor and shall only be submitted on the "Request for Information" forms as required by the Owner.
1. In the "Request for Information", the Contractor shall clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response is needed from the Architect.
 2. In the "Request for Information", the Contractor shall set forth an interpretation or understanding of the requirement along with reasons why such an understanding was reached.
 3. The Owner acknowledges that this is a complex project. Based upon the owner's past experience with projects of similar complexity, the Owner anticipates that there will probably be some "Requests for Information" on this project.
 4. The Architect will review all "Requests for Information" to determine whether they are valid "Requests for Information". If it is determined that the document is not a valid "Request for Information", it will be returned to the Contractor, unreviewed as to content, for resubmittal on the proper form and in the proper manner.
 5. A "Request for Information Response" shall be issued within seven (7) days of receipt of the request from the Contractor unless the Owner determines that a longer time is necessary to provide an adequate response. If a longer time is determined necessary by the Owner, the Owner will, within seven (7) days of receipt of the request, notify the Contractor of the anticipated response time. If the Contractor submits a "Request for Information" on an activity with seven (7) days or less of float on the current project schedule, the Contractor shall not be entitled to any time extension due to the time it takes the Architect to respond to the request provided that the Architect responds within the seven (7) days set forth above.
 6. A "Request for Information Response" from Architect will not change any requirement of the Contract Documents. In the event the Contractor believes that the "Request for Information Response" will cause a change to the requirements of the Contract Documents, the Contractor shall within five (5) days give written notice to the Construction Administrator stating that the Contractor believes the "Request for

Information Response" will result in a "Change Order" and the Contractor intends to submit a "Change Order Proposal" request. Failure to give such written notice within five (5) days shall waive the Contractor's right to seek additional time or cost under the requirements these Requirements.

1.4 MINOR CHANGES IN THE WORK

- A. The Architect, through the Construction Administrator, will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or Contract Time, on the "Supplemental Instructions" form as required by the Owner.

1.5 PROPOSAL REQUEST

- A. Architect/Owner-Initiated Requests For Proposals: The Architect or Owner will issue a detailed description of proposed changes in the Work via the Construction Administrator that will require adjustment to the Contract Sum or Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications. Such requests shall be on a "Proposal Request" form as required by the Owner.
1. "Proposal Request" is issued for information only. Do not consider them as an instruction either to stop work in progress or to execute the proposed change.
 2. Within (14) days of receipt of a "Proposal Request", submit a "Change Order Proposal" with the required information necessary to execute the change to the Construction Administrator for the Architect's/Owner's review.
 - a. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.
 - d. The Agency is tax exempt. All Contractor and Subcontractor services provided under your Contract with the State of Connecticut may not be exempt from taxes. The Department of Revenue Services can guide you as to which services are exempt and which are not. Please contact the State of Connecticut, Department of Revenue Services at 1-800-382-9463 or 860-541-3280.
 - e. Dollar values shown on the Schedule of Values shall not be the governing (or deciding) final amounts for change orders involving either additional charges or deletions.

1.6 CHANGE ORDER PROPOSAL

- A. When either a "Request for Information" from the Contractor or a "Proposal Request" from the Architect or Owner results in conditions that may require modifications to the Contract, the Contractor may propose changes by submitting a request for a "Change Order Proposal" to the Architect via the Construction Administrator on forms as required by the Owner. These forms shall also include "Change Order Proposal Workbook(s)" as required by the Owner.
1. Include statements outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.
 2. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities as directed by Article 13 of the General Conditions of the Contract for Construction.
 3. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
 4. Comply with requirements in Division 01 Section 01 25 00 "Substitution Procedures" if the proposed change requires an equal or substitution of one product or system for a product or system specified.
 5. The State of Connecticut construction contract has the following tax exemptions:
 - a. Purchasing of materials which will be physically incorporated and become a permanent part of the project.
 - b. Tools, supplies and equipment used in fulfilling the construction contract are not exempt.
 - c. Services that are resold by the Contractor are exempt, i.e. if a Contractor hires a plumber, carpenter or electrician, a resale certificate may be issued to the subcontractor because these services are considered to be integral and inseparable component parts of the building contract

- C. "Change Order Request" Forms: Use "Change Order Proposal" and "Change Order Proposal Worksheets" forms as required by Owner.
- D. A "Change Order Proposal" cannot be submitted without either prior submission of a "Request for Information" from the Contractor or as a response to a "Proposal Request" submitted by the Architect or Owner.
- E. Any "Change Order Request" submitted without a prior submittal of a "Request for Information" or as a response to a "Proposal Request" will be immediately rejected and returned to the Contractor.

1.7 CONSTRUCTION CHANGE DIRECTIVE

A. "Construction Change Directive":

When the Owner and the Contractor disagree on the terms of a "Change Order Proposal" resulting from either a "Request for Information" or "Proposal Request", then the Architect through the Construction Administrator may issue a "Construction Change Directive" on a "Construction Change Directive" form as authorized by the Owner. The "Construction Change Directive" instructs the Contractor to proceed with a change in the Work, for subsequent inclusion in a "Change Order".

- 1. The "Construction Change Directive" contains a complete description of the change in the Work. It also designates the method to be followed to determine change in the Contract Sum or Contract Time.
 - 2. Contractor must proceed with the Work once a "Construction Change Directive" is issued.
 - 3. The change in the Contract Sum and Contract Time resulting from the issuance of a "Construction Change Directive" will be based on "Time & Material" or "Unit Prices".
 - 4. Issuance of "Construction Change Directive" does not guarantee payment for the Work described in the "Construction Change Directive".
- B. Documentation: The Contractor shall maintain detailed records on a time and material basis of work required by the "Construction Change Directive".
- 1. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.
 - 2. The final value shall be negotiated based on the supporting data to determine the value of the work.

1.8 CHANGE ORDER PROCEDURES

- A. Upon the Owner's approval of a Contractor's "Change Order Proposal", the Construction Administrator will issue a "Change Order" for signatures of the Architect, Owner and the Contractor on a "Change Order" form as required by the Owner.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 26 00

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies procedures for preparation and submittal of the Contractor's Applications for Payment.
- B. Related Sections: The following Sections contain requirements that relate to this Section.
 - 1. Notice to Bidders: Article 10
 - 2. General Conditions: Articles: 27 "Schedule of Values, Application for Payment"; 28 "Partial Payments"; 31 "Final Payment"; and 32 "Owner's Right to Withhold Payments".
 - 3. Division 01 Section 01 32 16 "Construction Progress Schedules" for requirements for construction scheduling and reporting progress of work.
 - 4. Division 01 Section 01 33 00 "Submittal Procedures".
 - 5. Division 01 Section 01 77 00 "Closeout Procedures" for requirements for Final Payment.

1.3 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the "Schedule of Values" with preparation of the CPM Schedule or Construction Schedule. Use "Schedule of Values" form as required by the Owner
 - 1. Submit the "Schedule of Values" to the Construction Administrator at the earliest possible date but no later than twenty-one (21) days after Contract Start Date.
 - 2. Sub-schedules: Where Work is separated into phases requiring separately phased payments, provide sub-schedules showing values correlated with each phase of payment.
- B. Format and Content: Use the Project Manual Table of Contents as a guide to establish the format for the "Schedule of Values". Provide at least one line item for each Specification Section on electronic media printout.
 - 1. Identification: Project identification on the Schedule of Values shall include, but not be limited to, the following:
 - a. Owner
 - b. Project Number
 - c. Project Name
 - d. Project Location
 - e. Contractor's name and address.
 - 2. Arrange the "Schedule of Values" in tabular format as required by the Owner, containing separate columns including, but not limited to, the following Items:
 - a. Item Number.
 - b. Description of Work with Related Specification Section or Division Number.
 - c. Scheduled Values broken down by description number, type material, units of each material.
 - 1) Include break down of General Condition requirements, i.e. bonds, insurance premiums, taxes, job mobilization, temporary facilities, field supervision and layout, operation and maintenance manuals, punch list activities, project record documents, demonstration and training, overhead, and profit as separate line items.
 - d. Name of subcontractor.
 - e. Name of manufacturer or fabricator.
 - f. Name of supplier.
 - g. Retainage.
 - h. Contract sum in sufficient detail.

3. Percentage of Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
4. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual Table of Contents. Break principal subcontract amounts down into several line items. In addition, the following items listed below must be included.
 - a. Site Logistics Plan (01 31 00): a lump sum at 1/20 of one percent of the base bid total project cost at the time of submission of this plan.
 - b. Coordination Drawings (01 31 00): a lump sum of this cost for payment at the submittal of this product a minimum cost of 1/10th of one percent of the base bid total project cost or \$5,000 whichever is greater.
 - c. Photographic Documentation (01 32 33): a monthly cost of \$1,000 per month to be paid each month upon receipt of the photographs or forfeit of that month's payment.
 - d. Submittal Schedule (01 33 00): a lump sum payment calculated at 1/20th of 1% of the base bid total project cost upon receipt of the schedule
 - e. Waste Collection & Cleaning (01 50 00): a monthly cost. A minimum payment of \$1,000 to \$3,000 (based on size & complexity of the project) with forfeit of that monthly payment if not done.
 - f. As-Built Updates (01 31 00): a monthly cost, a minimum payment of \$1,000 with forfeit of that monthly payment if not done.
 - g. Start-up and Adjusting (01 75 00): a lump sum cost upon completion. (to be determined by the DAS/CS Project Manager (PM) with Architect/Engineer and Construction Administrator (CA) advice)
 - h. Schedule (01 32 16): For the Base Schedule a lump sum payment or 40% of the total schedule budget, with the remainder paid on an even payment over the duration of the project.
5. Round amounts to nearest whole dollar; the total shall equal the Contract Sum.
6. Unit-Cost Allowances: Show the line-item value of unit-cost allowances, as a product of the unit cost, multiplied by the measured quantity. Estimate quantities from the best indication in the Contract Documents.
7. General Conditions: Show line items for indirect costs and margins on actual costs only when such items are listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete. Include the total cost and proportionate share of general overhead and profit margin for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at the Contractor's option.

1.4 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and Construction Administrator and paid for by the Owner.
 1. The initial "Application for Payment", the "Application for Payment" at time of "Substantial Completion", and the final "Application for Payment", involve additional requirements.
- B. Payment-Application Terms: The Owner will process monthly progress payments. The Contractor may submit applications for payment on a monthly basis.
- C. Payment-Application Forms: Use the "Application for Payment" form as required by the Owner. Present the required information on electronic media printout or Owner approved form; multiple pages should be used if required.
 1. For each item, provide a column including but not limited to the following items:
 - a. Item Number.
 - b. Description of Work and Related Specification Section or Division.
 - c. Scheduled Value, break down by units of material and units of labor.
 - d. Work Completed from previous application.
 - e. Work Completed this period.
 - f. Materials presently stored.
 - g. Total Completed and stored to date of application.

- h. Percentage of Completion.
 - i. Balance to Finish.
 - j. Retainage.
- D. Application Preparation: Complete every entry on the Application form. At the time of Final Payment only, include an executed Application form by a person authorized to sign legal documents on behalf of the Contractor. The Construction Administrator will return incomplete Applications without action.
 - 1. Entries shall match data on the "Schedule of Values".
 - 2. Include amounts of Change Orders issued prior to the last day of the construction period covered by the application.
- E. Transmittal: Except for final payment, submit to the Construction Administrator by a method ensuring receipt within *forty-eight (48)* hours. *One (1)* complete, signed and notarized original of each Application for Payment, including lien waivers and similar attachments when required, along with *six (6)* copies. For Final Payment, *nine (9)* complete, signed and notarized copies shall be submitted.
 - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information related to the application, in a manner acceptable to the Architect.
- F. Applications for Payment: Administrative actions and submittals, that must precede or coincide with submittal of the first Application for Payment and all subsequent Application for Payments including, but not limited to, the following items:
 - 1. List of subcontractors and suppliers' name, FEIN/Social Security numbers, and Connecticut Tax Registration Numbers.
 - 2. List of principal suppliers and fabricators.
 - 3. Schedule of Values.
 - 4. Contractor's Construction Schedule (preliminary if not final).
 - 5. Schedule of principal products.
 - 6. Submittal Schedule (preliminary if not final).
 - 7. List of Contractor's staff assignments.
 - 8. List of Contractor's principal consultants.
 - 9. Copies of all applicable permits.
 - 10. Copies of authorizations and licenses from governing authorities for performance of the Work.
 - 11. Proof that subcontractors have been paid amounts included on the Contractor's Application for Payment within thirty (30) days after the Owner has paid the Contractor for the particular Application for Payment in accordance with Connecticut General Statute § 49-41a (a)(1).
 - 12. Releases of Lien from subcontractors with amounts included on the Contractor's Application for Payment when Contractor has been paid by the Owner for the particular Application for Payment but the subcontractors have not been paid.
 - 13. Proof that as-built documents are updated as required by Section 01 77 00 "Closeout Procedures.
 - 14. Initial as-built survey and damage report, if required.
 - 15. Update the "Contractor's Master Subcontract Agreement List" and submit copies all recently executed Subcontract Agreements in accordance with CGS § 4b-96.
 - 15.1. The "Contractor's Master Subcontract Agreement List" shall list all Subcontract Agreements in order of Contract Sum magnitude (from high to low) in the following format:

| Contractor's Master Subcontract Agreement List | | | | |
|--|--|-------|---------|--------------|
| Subcontractor Name | Minority Or Small Business Designation | Trade | Address | Contract Sum |
| | | | | |
| | | | | |

- 16. In accordance with CGS § 42-158j (b):
 Each payment requisition submitted shall include a statement showing the status of all pending construction change orders, other pending change directives and approved changes to the original

contract or subcontract. Such statement shall identify the pending construction change orders and other pending change directives, and shall include the date such change orders and directives were initiated, the costs associated with their performance and a description of any work completed. As used in this section, "pending construction change order" or "other pending change directive" means an authorized directive for extra work that has been issued to a contractor or a subcontractor and identified by an official Change Order Number or Construction Change Directive Number assigned by the State of Connecticut.

- G. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion submit an Application for Payment form; use the form as required by the Owner. Present the required information on electronic media printout as applicable that include, but are not limited, to the following:
1. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
 2. Administrative actions and submittals that shall precede or coincide with this application include, but are not limited to, the following:
 - 2.1 Occupancy permits and similar approvals.
 - 2.2 Warranties (guarantees) and maintenance agreements.
 - 2.3 Test/adjust/balance records.
 - 2.4 Maintenance instructions.
 - 2.5 Meter readings.
 - 2.6 Startup performance reports.
 - 2.7 Changeover information related to Owner's occupancy, use, operation, and maintenance.
 - 2.8 Final cleaning.
 - 2.9 Application for reduction of retainage and consent of surety.
 - 2.10 Advice on shifting insurance coverage.
 - 2.11 Final progress photographs.
 - 2.12 List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.
- H. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include, but are not limited, to the following:
1. Completion of Project Closeout requirements.
 2. Completion of list of items remaining to be completed as indicated on the attachment to the Certificate of Substantial Completion.
 3. Ensure that unsettled claims will be settled.
 4. Ensure that incomplete Work is not accepted and will be completed in accordance with a schedule prepared by the Contractor which is acceptable to the Owner.
 5. Transmittal of required Project construction records to the Owner (including as-built documents specified in Section 01 77 00 "Closeout Procedures").
 6. Certified property survey.
 7. Proof that taxes, fees, and similar obligations were paid.
 8. Removal of temporary facilities and services.
 9. Removal of surplus materials, rubbish, and similar elements (Reference Section 01 74 19 "Construction Waste Management & Disposal").
 10. Change of door locks to Owner's access.
 11. The requirements of the General Conditions and Supplementary Conditions for Final Acceptance, Final Completion, Final Inspection, and Final Payment.
 12. Asbestos, lead or other hazardous material manifests.
 13. Completion of "Building Contractor Reporting Form" as supplied by Department of Construction Services, for all Contractors, Subcontractors, Vendors, Suppliers, etc. who work on the Contract. The form includes the following information:
 - a. Contractor/Subcontractor name.

- b. FEIN/Social Security Numbers
- c. Connecticut Tax Registration Numbers
- d. Type of work
- e. Name of business and address
- f. Remittance address.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 29 76

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:
 - 1. General project coordination procedures.
 - 2. Conservation.
 - 3. Coordination Drawings, including Site Logistics Plans.
 - 4. Administrative and supervisory personnel.
 - 5. Cleaning and protection.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section 01 29 76 "Progress Payment Procedures" for Schedule of Values items
 - 2. Division 01 Section 01 31 19 "Project Meetings" for progress meetings, coordination meetings, and pre-installation conferences.
 - 3. Division 01 Section 01 32 16 "Construction Progress Schedules" for requirements for construction scheduling and reporting progress of work.
 - 4. Division 01 Section 01 50 00 "Temporary Facilities and Controls".
 - 5. Division 01 Section 01 60 00 "Product Requirements" for coordinating general installation.
 - 6. Division 01 Section 01 71 23 "Field Engineering" specifies procedures for field engineering services, including establishment of benchmarks and control points.
 - 7. Division 01 Section 01 77 00 "Closeout Procedures" for coordinating contract closeout.
 - 8. Division 01 Section 01 91 00 "Commissioning" defines the commissioning process.

1.3 CONSTRUCTION ADMINISTRATOR

- A. Construction Administrator:
 - 1. The Construction Administrator is identified in Division 01 Section 01 11 00 "Summary of Work".
 - 2. Construction Mobilization:
 - a. Cooperate with the Construction Administrator in the allocation of mobilization areas of the site, for field offices and sheds, for agency facility access, traffic, and parking facilities.
 - b. During Construction, coordinate use of site and facilities through the Construction Administrator.
 - c. Comply with Construction Administrator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
 - d. Comply with instructions of the Construction Administrator for use of temporary utilities and construction facilities.
 - e. Coordinate field engineering layout as specified in Division 01 Section 01 71 23 "Field Engineering" for work under the instructions of the Construction Administrator.

1.4 COORDINATION

- A. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
3. Make provisions to accommodate items scheduled for later installation.
- B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.
 1. Prepare similar memoranda for the Construction Administrator, Owner and separate contractors where coordination of their work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 1. Preparation of schedules.
 2. Installation and removal of temporary facilities.
 3. Delivery and processing of submittals.
 4. Progress meetings.
 5. Project closeout activities.
 6. As-Builts - coordinate monthly meetings to assure up-dates being performed.

1.5 SUBMITTALS

- A. Coordination Drawings: Prepare coordination drawings to complete detailed coordination of systems and components and to integrate information about fabrication and installation.
 1. Thoroughly prepare coordination drawings, as further stipulated in Part 3 "Execution", reviewing all contract documents and consulting with all entities contributing to or involved with each portion of the work under consideration.
 - a. Show the relationship of all components shown on any separate Shop Drawings.
 - b. Indicate required desired installation sequences.
 - c. Comply with requirements contained in Division 01 Section 01 33 00 "Submittal Procedures".
 2. Prepare coordination drawings for installation of all products and materials fabricated by separate entities.
 3. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components, including but not limited to: all site-utility entry points; all ceiling and roof cavities in all areas; all electrical, telecommunications and mechanical rooms; all stage-boundary interface areas; all laboratories, animal-handling rooms and data rooms; all classrooms and seminar rooms; all lecture halls and their support spaces; all video studios, broadcast classrooms and their support facilities; and all such other conditions required to coordinate the work.
 4. Prepare a Site Logistics Plan(s) showing: The entire project area and limits; all routes into and out of site; all staging and stockpiling and lay-down areas; all aspects of phasing/staging; all parking, paving and fencing; and all specific provisions to satisfy requirements of Division 01 Sections, including but not limited to Field Engineering and Temporary Facilities and Controls. The Site Logistics Plan shall coincide with and complement the general staging plans and site plans outlined in the contract bidding documents. It is intended that the Contractor shall present this refined plan for approval by the Construction Administrator. The fencing shown on this plan is required for all phases. Exact placement and timing of installations and removals will be reviewed and approved by the Construction Administrator prior to implementation. An additional allotment of various fencing is specified in Division 32, which the Contractor shall provide, install, and relocate at various intervals, for installation and removal by the Contractor per the direction of the project's Construction Administrator. This staging and logistics plan will require refinement and change for each phase/stage of the project. The Site Logistics Plan(s) shall be drawn at a scale no smaller than 1"=40' and shall be submitted as stipulated in Division 01 Section 01 29 76 "Progress Payment Procedures", but in no case later than (30) days after Notice to Proceed.
 5. Prepare coordination drawings showing locations of surface recesses and voids, as well as offsets and breaks, requiring filling and/or feathering, both those initially visible and those discovered during the course of work. Review with Owner and Architect to obtain direction for filling and feathering. Revise drawing(s) to record directions for same for field and record purposes.

- B. Staff Names: Prior to the contract start date, submit a list of the Contractor's principal staff assignments, including the superintendent, project safety officer, and other personnel in attendance at the Project Site. Identify individuals and their duties and responsibilities. List their addresses and telephone numbers.
 - 1. Post copies of the list in the Project meeting room, the temporary field office, and at each temporary telephone.
 - 2. Provide resumes of each staff member proposed for the Project. This shall include the Project Manager, Project Superintendent and Safety Officer.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 GENERAL COORDINATION PROVISIONS

- A. Inspection of Conditions: The Contractor shall require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed and coordinate such inspections with the Construction Administrator and authorities having jurisdictions. If unsatisfactory conditions exist notify the Construction Administrator immediately. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. The Contractor shall coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.
- C. Coordination Drawings: Before construction work can begin, the Contractor shall submit to the Architect coordination drawings in the form of (a) reproducible (vellum) transparencies at not less than 1/4-inch scale and (b) CAD files of the coordination drawings on CDROM. Such drawings will be required throughout all areas for trades as described below. These drawings shall show resolutions of trade conflicts in congested areas. The Architect will supply base drawings (with the title blocks removed), including floor plans, reflected ceiling plans, and structural framing plans, in the form of electronic CAD files on CDROM, using the AutoCAD release edition specified with the files, to the Contractor for distribution to the trades for use in developing the coordination drawings. Each trade contractor shall create separate layers within the CAD files to show the work of their trade. Prepare coordination drawings as follows:
 - 1. The HVAC subcontractor shall initiate 1/4-inch scale drawings done on AutoCAD (latest version) showing ducts and piping in plan and section. Sheet metal shop drawings must be approved prior to starting coordination drawings.
 - 2. The Sprinkler subcontractor shall then add layers to superimpose his piping layout on the coordination drawings.
 - 3. The Electrical subcontractor shall then add layers to superimpose all the electrical information on the coordination drawings. Said information is to include but not necessarily be limited to cable trays, equipment, lighting, conduits, bus duct, etc. Show space allowances reserved for work under other contracts, such as audio-visual wiring and equipment.
 - 4. The Plumbing subcontractor shall then add layers to complete the coordination drawing by drawing his piping (including pitch) on the coordination drawings.
 - 5. Subcontractors for specialties, furnishings, equipment and special construction shall add layers to show their work to assure full coordination of all systems.
 - 6. The Construction Administrator shall review the completed coordination drawings for general compliance and then submit them to the Architect for his review. All subcontractors shall rework the drawings until all systems are properly coordinated.
 - 7. The Ceiling subcontractor shall utilize the drawings to prepare acoustic panel ceiling drawings and any other suspended ceiling drawings, and shall indicate areas of conflict with the work of other trades by drafting the location of grids, panels and tiles.
 - 8. The Contractor shall indicate Architectural/Structural conflicts or obstacles and coordinate to suit the overall construction schedule. The Contractor shall locate all precut and prefabricated holes and openings in structural steel on the CAD coordination drawing files as required for HVAC, plumbing, fire protection and electrical work. The Contractor shall coordinate these holes and openings with the structural steel fabricator during the structural steel shop drawing development phase. Coordination to take place on schedule so as to permit shop fabrication of all structural steel holes and openings. The

Owner will not be held responsible for the costs associated with field fabrication of structural openings resulting from the lack of timely and thorough coordination.

9. The Contractor shall expedite all drawing work and coordinate to suit the construction schedule. The Contractor shall then review these drawings and compare them with the Architectural, Structural, Equipment, and other drawings and determine that all of the work can be installed without undue interference. Prior to the submittal to the Architect, areas of potential conflict shall be brought to the attention of the Contractor who shall convene a coordination meeting of all parties involved, for the purpose of resolving all utility conflicts. The Contractor shall supervise and direct corrective measures and have all trades sign acceptance of the drawings. Submit four (4) hard copies of each drawing to the Architect and two (2) copies to the Construction Administrator for the record, and only after all conflicts have been accommodated.
 10. If the coordination meeting fails to resolve coordination conflicts, the Contractor shall indicate the nature of such conflicts in a detailed RFI, proposing the most economical solution.
 11. The Contractor shall not permit work by trades to proceed in a given bay or area until all trade foremen agree on the exact arrangements for each room or area. If a given trade proceeds prior to trades approval, then if necessary, that trade shall revise their work, if necessary, at no extra cost, in order to permit other trades to proceed.
 12. Submit all coordination drawings on CD-ROM, in addition to hard copy.
- D. The Construction Administrator will meet with the Contractor on all major items of coordination.

3.2 CLEANING AND PROTECTION

- A. Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering, where required, to assure protection from damage or deterioration.
- B. Clean and provide maintenance on completed construction as construction per manufacturers requirements through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.
- C. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
 1. Excessive static or dynamic loading.
 2. Excessive internal or external pressures.
 3. Excessively high or low temperatures.
 4. Thermal shock.
 5. Excessively high or low humidity.
 6. Air contamination or pollution.
 7. Water or ice.
 8. Solvents.
 9. Chemicals.
 10. Light.
 11. Radiation.
 12. Puncture.
 13. Abrasion.
 14. Heavy traffic.
 15. Soiling, staining, and corrosion.
 16. Bacteria.
 17. Rodent and insect infestation.
 18. Combustion.
 19. Electrical current.
 20. High-speed operation.
 21. Improper lubrication.

22. Unusual wear or other misuse.
23. Contact between incompatible materials.
24. Destructive testing.
25. Misalignment.
26. Excessive weathering.
27. Unprotected storage.
28. Improper shipping or handling.
29. Theft.
30. Vandalism.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 31 00

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for project meetings, including, but not limited to, the following:
 - 1. Start Date meeting (establishes start date)
 - 2. Pre-construction conferences.
 - 3. Pre-installation conferences.
 - 4. Progress meetings.
 - 5. Safety
 - 6. Coordination
 - 7. As-built drawings review
 - 8. And as required
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section 01 31 00 "Project Management and Coordination" for procedures for coordinating project meetings with other construction activities.
 - 2. Division 01 Section 01 32 16 "Construction Progress Schedules" for requirements for construction scheduling and reporting progress of work.
 - 3. Division 01 Section 01 33 00 "Submittal Procedures" for submitting the Construction Schedule or CPM Schedule.
 - 4. Division 01 Section 01 35 26 "Government Safety Requirements specifies the requirements for safety plans, reports, and investigation submittals.
 - 5. Division 03 Section 03 33 30 "Architectural Concrete" for pre-installation/erection conferences.
 - 6. Division 07 Section 07 53 23 "EPDM Roofing" for pre-construction conferences.

1.3 PRE-CONSTRUCTION CONFERENCE

- A. The Contractor will attend a pre-construction conference before starting construction, as scheduled by the Construction Administrator convenient to the Owner, the Construction Administrator, Architect, and Contractor. This meeting will take place at least fourteen (14) days prior to official Start Date. Hold the conference at the Project Site or another convenient location as directed by the Construction Administrator. The Construction Administrator shall conduct the Pre-construction Conference to review the Contractor and Subcontractor responsibilities and personnel assignments.
- B. Attendees: Authorized representatives of the Construction Administrator, Owner, Architect, and their consultants; the Contractor and its superintendent; major subcontractors; agency; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
- C. Agenda: Discuss items of significance that could affect progress, including the following:
 - 1. Tentative construction schedule.
 - 2. Critical work sequencing.
 - 3. Progress meeting schedule.
 - 4. Designation of responsible personnel.
 - 5. Procedures for processing field decisions and Change Orders.
 - 6. Procedures for processing Applications for Payment.
 - 7. Distribution of Contract Documents.

8. Submittal of Shop Drawings, Product Data, and Samples.
9. Preparation of record documents.
10. Use of the premises.
11. Parking availability.
12. Office, work, and storage areas.
13. Equipment deliveries and priorities.
14. Safety procedures.
15. First aid.
16. Security.
17. Housekeeping.
18. Working hours.
19. Coordination with Audio Visual and Telecommunications.

1.4 PRE-INSTALLATION/CONSTRUCTION CONFERENCES

- A.** The Contractor will schedule a pre-installation conference(s) at the Project Site before each construction activity that requires coordination with other construction. The Contractor shall be responsible to notify in writing the Construction Administrator and the appropriate Subcontractor(s), etc., of the date and time of all Pre-installation/Construction Conferences. Notification shall be at least seven (7) days, prior to the Conference. The Contractor shall be responsible for coordination and attendance of all Subcontractors, etc., involved in or affected by the installation for all Pre-installation/Construction Conferences.
- B.** Attendees: The Construction Administrator, Contractor, Subcontractors, Owner and Architect, the installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. The Contractor shall advise all attendees of the scheduled Pre-installation/Construction Conferences dates.
- C.** Agenda: Review the progress of other construction activities and preparations for the particular activity under consideration at each Pre-installation/Construction Conference, including but not limited to the following requirements:
 1. Contract Documents.
 2. Options.
 3. Related Change Orders.
 4. Purchases.
 5. Deliveries.
 6. Shop Drawings, Product Data, and quality-control samples.
 7. Review of mockups.
 8. Possible conflicts.
 9. Compatibility problems.
 10. Time schedules.
 11. Weather limitations.
 12. Manufacturer's recommendations.
 13. Warranty requirements.
 14. Compatibility of materials.
 15. Acceptability of substrates.
 16. Temporary facilities.
 17. Space and access limitations.
 18. Governing regulations.

- 19. Safety.
- 20. Inspecting and testing requirements.
- 21. Required performance results.
- 22. Recording requirements.
- 23. Protection.

- D. The Construction Administrator will record significant discussions and agreements and disagreements of each Pre-installation/Construction Conference, and the approved schedule. The Construction Administrator will promptly distribute the record of the Pre-installation/Construction Conference to all attendees.
- E. The Contractor shall not proceed with the installation/construction if the conference cannot be successfully concluded. The Contractor shall be responsible to initiate whatever actions are necessary to resolve impediments to performance of Work and schedule and reconvene another Pre-installation/Construction Conference at the earliest feasible date. Failure of the contractor to resolve impediments to the performance of the work will not result in an extension of days.

1.5 PROGRESS MEETINGS

- A. The Construction Administrator will conduct progress meetings, bi-weekly, at the Project Site or at regular intervals as agreed upon at the Pre-construction Conference. The Construction Administrator will notify the Owner, the Architect, and the Contractor of the scheduled Progress Meeting dates. Coordinate dates of Progress Meetings with preparation of Application for Payment requests.
- B. Attendees: In addition to representatives of the Contractor, Construction Administrator, Owner and the Architect, subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of future activities may be requested to attend these meetings on an as needed basis. All participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Work. The Contractor shall include the site superintendent as a minimum.
- C. Agenda: Progress Meetings shall review and correct or approve minutes of the previous Progress Meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the Project.
 - 1. Construction Schedule or CPM Schedule: Review progress since the last Progress Meeting. Determine where each activity is in relation to the required Contractor's "Construction Schedule" or "CPM Schedule" and whether each activity is on time or ahead or behind Schedule. Determine how Work that is behind Schedule will be expedited; secure commitments from parties involved to do so. Discuss whether Schedule revisions are required to insure that current and subsequent activities will be completed within the Contract Time.
 - 2. Review the present and future needs of each entity present, including the following:
 - a. Interface requirements.
 - b. Time.
 - c. Sequences.
 - d. Status of submittals.
 - e. Deliveries.
 - f. Off-site fabrication problems.
 - g. Access.
 - h. Site utilization.
 - i. Temporary facilities and services.
 - j. Hours of work.
 - k. Hazards and risks.
 - l. Housekeeping.
 - m. Quality and work standards.
 - n. Change Orders.
 - o. Documentation of information for payment requests.

- D. Reporting: The Construction Administrator will distribute minutes of the meeting to each party present, promptly and before the next scheduled meeting, and to parties who should have been present.

1.6 SUBCONTRACTOR/COORDINATION/SAFETY MEETINGS

- A. The Contractor shall conduct Subcontractor/coordination meetings.
- B. The Contractor shall conduct a separate safety meeting after the safety plan is submitted. The Contractor shall take meeting minutes. These minutes shall be made available upon request. The Contractor shall notify the Construction Administrator of the times and dates of these meetings, who may elect to attend these meetings as an observer when necessary. A minimum of one safety meeting will be held per month.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 31 19

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for the preparation, submittal, and maintenance of the Contractor's computerized progress schedule, reporting progress of the Work, and Contract time adjustments, including the following:

1. Preliminary schedule.
2. Baseline schedule.
3. Two (2) week look ahead schedules.
4. Schedule revisions.
5. Recovery schedules.
6. Narratives.
7. Schedule time extensions.

- B. The above listed Project schedules shall be used for evaluating all issues related to time for this Contract. The Project schedules shall be updated in accordance with the requirements of this Section to reflect the actual progress of the Work and the Contractor's current plan for the timely completion of the Work. The Project schedules shall be used by the Owner and Contractor for the following purposes as well as any other purpose where the issue of time is relevant:

1. To communicate to the Owner the Contractor's current plan for carrying out the Work;
2. To identify work paths that are critical to the timely completion of the Work;
3. To identify upcoming activities on the Critical Path(s);
4. To evaluate the best course of action for mitigating the impact of unforeseen events;
5. As the basis for analyzing the time impact of changes in the Work;
6. As a reference in determining the cost associated with increases or decreases in the Work;
7. To identify when submittals will be submitted to the Owner;
8. To prioritize the Owner's review of submittals;
9. To document the actual progress of the Work;
10. To evaluate resource requirements of the Contractor and the Owner;
11. To integrate the Work with the operational requirements of the Owner's facilities;
12. To facilitate efforts to complete the Work in a timely manner.
13. To document the history of the Work.

- B. Refer to the General Conditions and the Agreement for definitions and specific dates of Contract Time.

- C. **Related Sections:** The following Sections contain requirements that relate to this Section:

1. Division 01 Section 01 11 00 "Summary of Work" specifies the scope of work for the various phases, requirements regarding the Contractor's use of premises, occupancy requirements, products ordered in advance, and Owner furnished products.
2. Division 01 Section 01 25 00 "Substitution Procedures" specifies requirements for handling requests for equals and substitutions.
3. Division 01 Section 01 26 00 "Contract Modification Procedures" specifies requirements for handling and processing contract modifications.
4. Division 01 Section 01 29 76 "Progress Payment Procedures" specifies requirements for submitting Schedule of Values and Application for Payments.

5. Division 01 Section 01 31 00 "Project Management and Coordination" specifies requirements for coordinating construction operations.
6. Division 01 Section 01 31 19 "Project Meetings" specifies requirements for submitting and distributing meeting and conference minutes.
7. Division 01 Section 01 33 00 "Submittal Procedures" specifies requirements for submitting the monthly computerized progress schedule.
8. Division 01 Section 01 45 00 "Quality Control" specifies requirements for submitting inspection and test reports.
9. Division 01 Section 01 50 00 "Temporary Facilities and Controls" specifies requirements for temporary utilities, support facilities, and security protection.
10. Division 01 Section 01 60 00 "Product Requirements" specifies requirements for submitting the list of products.
11. Division 01 Section 01 77 00 "Closeout Procedures" specifies requirements for Contract closeout.

1.3 DEFINITIONS

- A. **Critical Path Method (CPM):** A method of planning and scheduling a construction project where activities are arranged based on activity relationships and network calculations determine when activities can be performed and the critical path of the Project.
- B. **Critical Path:** The longest continuous chain of activities through the network at a given data date for the Schedule to a Contract Milestone or Contract Completion. Where the path to a specific Milestone has become negative, the Critical Path shall be the longest continuous chain of activities with the greatest amount of negative float.
- C. **Near Critical Path:** Any continuous series of activities through the network to the Contract Milestone or the Contract Completion Date where the Total Float of the activity at the data date along that path is within fifteen (15) days of the Total Float possessed by the activity at the data date along the Critical Path.
- D. **Network Diagram:** A graphic diagram of a network schedule, showing the activities and activity relationships.
- E. **Activity:** A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 1. Critical activities are activities on the critical path.
 2. Predecessor activity is an activity that must be completed before a given activity can be started.
- F. **Event:** An event is the starting or ending point of an activity.
- G. **Milestone:** A key or critical point in time for reference or measurement.
- H. **Float:** Is the measure of leeway in activity performance. Accumulative float time belongs to the Owner.
 1. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the following activity.
 2. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned project completion date.
- I. **Total Float:** The number of days from the late finish date (LF) to the early finish date (EF) of an activity at a given data date for the Schedule. When the LF is later than the EF, the Total Float shall be positive. When the LF and the EF are the same, the Total Float shall be zero. When the LF is earlier than the EF, the Total Float shall be negative. Unless otherwise specified all references to "float" shall mean "Total Float."
- J. **Fragnet:** The sequence of new activities and/or activity revisions, logic or resource changes that are proposed to be added to the existing schedule to demonstrate the influence of impacts to the schedule. The Fragnet shall identify the predecessors to the new activities and demonstrate the impacts to successor activities.

1.4 QUALITY ASSURANCE

- A. **Construction Scheduler:**
 1. The Contractor is required to employ or retain the services of an individual skilled in construction scheduling ("Construction Scheduler"). For projects with a Contract value greater than five (5) million dollars, the Construction Scheduler shall have at least five (5) years of verifiable experience as the person primarily responsible for preparing and maintaining detailed project schedules on projects of the same or similar size and nature as this project. The Construction Scheduler is required to attend meetings pertaining to scheduling and progress of the work including all progress meetings.

2. Within five (5) days after the Notice of Award, the Contractor shall provide a statement to the Owner with the following:
 - a. Identification, qualifications, and experience of the Contractor's Construction Scheduler and all other members of the Contractor's scheduling staff.
 - b. References of not less than two (2) previous projects on which the Contractor's Construction Scheduler has utilized CPM scheduling.
 3. The Owner reserves the right to disapprove any Construction Scheduler candidate proposed for the project and/or remove, without rights to work on the project, any member of the Contractor's scheduling staff that is, in the Owner's opinion, not qualified. In case of disapproval, the Contractor shall resubmit the qualifications and references of the proposed alternate Construction Scheduler within ten (10) days. The Contractor must have its Construction Scheduler approved prior to the issuance of the Notice to Proceed and the submission of any schedule.
 4. Should the Construction Scheduler leave the employ of the Contractor or be re-assigned or relieved of his/her responsibilities as the Construction Scheduler on the project, the Contractor will be required to submit the qualifications of the proposed replacement Construction Scheduler within **10 days** after the date the former Construction Scheduler is no longer responsible for his/her duties on this Project.
- B. Scheduling Software:**
1. For Contracts greater than **five (5) million** dollars, the Contractor shall use the latest version of Primavera Project Planner as the scheduling software system for use on this Project.
 2. The Contractor shall provide one (1) licensed copy of the scheduling software to the Owner's CA for their use, registered in the Owner's name, complete with the entire manufacturer's manual, within **five (5) days** after the Contract award. The software manuals and license shall become the permanent property of the Owner.

1.5 CPM SCHEDULE FORMAT/CONTENT

- A. Format:** All Schedules required by this section shall be computer generated, critical path method (CPM) networks utilizing the precedence diagram method of scheduling.
- B. Electronic Schedule Naming:** The Contractor shall not submit any two (2) schedule files with the same file name. File names shall be in accordance with the following requirements:
1. Proposed/Final Preliminary Schedules shall be named P001, P002, P003, etc.
 2. Proposed/Final Baseline Schedules shall be named B001, B002, B003, etc.
 3. Final Updated Schedules shall be named U001, U002, U003, etc. Any revisions that are required at a particular update on a data date shall be numbered UA01, UB01, UC01, etc.
- C. Activity Identification:** Each activity in the Project schedules shall have an activity Identifier (activity ID). The Contractor is encouraged to utilize the activity ID to contain a structure enabling easy identification of work type, location, subcontractor, etc. The activity ID of an existing activity shall not be modified or assigned to another activity.
- D. Activity Description:** The activity description shall identify the scope of the activity and shall include a verb or work function (i.e. form, pour, execute, etc.), an object (i.e. slab, footing, wall, etc.), and location (i.e., first floor, roof, etc.). There shall not be any two activities with the same activity description. It shall not be necessary to investigate activity code assignments or logic relationships to identify the scope of an activity. For example, the description "Pour Footing" will not be acceptable. The description "Pour Footing West Wall, Section 2" will be acceptable. The terms "Miscellaneous," "Misc." and other vague adjectives shall not be used in an activity description. The Contractor shall standardize the use of terms and their spelling in all activity descriptions. Abbreviation used in activity descriptions shall be consistent with the abbreviations used throughout the Contract Documents and summarized on the Contract Drawings.
- E. Work Activities:** The Contractor shall include activities for work in the following list:
1. Mobilization.
 2. All required submittals and submittal review.
 3. Equipment and materials procurement/fabrication/delivery.
 4. Installing/operating temporary heat and utilities.
 5. Preliminary testing of equipment, instrumentation and controls.
 6. Final testing, including preparation time.

7. Substantial Completion: Substantial completion activity shall meet all requirements set forth in Division 01 Section 01 77 00 "Closeout Procedures".
 8. Punch list work.
 9. Operation and maintenance training.
 10. Demobilization.
 11. Final cleaning.
 12. Issuance of Certificate of Occupancy.
 13. Project Specific Issues (If Warranted).
- F. Maximum Activity Durations:** The Contractor shall prepare schedule utilizing activity durations in terms of days. Do not exceed twenty-one (21) day duration on activities except concrete curing, submittal review and equipment fabrication and deliveries. Where duration of continuous work exceeds twenty-one (21) days, subdivide activities by location or other sub-element of the work. At the request of the Owner, the Contractor shall substantiate the need for specific activities having longer durations than stated herein. If the Contractor fails to substantiate this need, then the Contractor shall modify activity durations and the corresponding work scope of the activities to the satisfaction of the Owner.
- G. Activity Dates:** Early and late start and finish dates of activities shall be calculated for each activity based upon the schedule data date, actual dates, schedule logic, schedule constraints, calendars and original duration or remaining duration, in accordance with the software to calculate incorrect early and late, start and finish dates, the Contractor shall be responsible to identify all such errors and to determine correct dates consistent with the parameters specified in this Section.
- H. Activity Predecessors and Successors:** Every activity shall have logically assigned predecessors and successors in conformance with the requirements of this Section. Unless otherwise specified, Notice to Proceed shall be the only activity in the Project Schedules without a predecessor. Unless otherwise specified, Acceptance and each Contract Milestone(s) shall be the only activity in the Project Schedules without a successor.
- I. Activity Constraints:** Activity Constraints can affect activity float calculations and shall not be used unless accepted by the Owner. The imposition of a date constraint on any activity shall only be permitted when the Contractor demonstrates the need for such a constraint to the satisfaction of the Owner.
- J. Imposed Project Finish Date:** The imposed project finish date shall be the Contract Completion date, or if the Contractor plans an early completion date, the date it plans to complete the Work.
- K. Negative Float:** Negative float is calculated when the user imposes a finish date or other constraint on the schedule and when an activity can only finish after its late finish date. The Contractor shall remove the imposed finish date and/or constraint causing the negative float when directed to do so by the Owner.
- L. Activity Codes:** The schedules shall contain activity code classifications and code values. The coding structure shall, at a minimum, include code fields for the following: Phase, Area, Location, Type of Work, Submittal/Procurement, Construction, Responsibility, Original/Extra Work, and **Division**. **All activities in the schedule must have non-blank values for the required codes.**
- M. Calendars:** The planning unit for the Work shall be days. The global calendar shall contain all union holidays. The Contractor shall coordinate holidays to be observed with the Owner and incorporate them into the schedule as non-working days. This Calendar shall be a **5-day** work week, Monday through Friday. Every activity shall be assigned a working day calendar based on when the activity is planned to occur and when it is contractually permitted to occur. The Contractor shall define and submit additional working day calendars for acceptance by the Owner that are necessary for completion of work in accordance with the requirements of the Contract Documents. Only Owner defined or Owner accepted working day calendars shall be utilized in the Project Schedules.
- N. Logic:** The Contractor shall be responsible for developing the logic of the Preliminary, Baseline and Recovery Schedules and for updating that logic each month to accurately reflect the progress of the Work to-date and the Contractor's current plan for the timely completion of the Work.
1. The following criteria shall form the basis for assembly of the schedule logic:
 - a. Which activity must be completed before a subsequent activity can be started?
 - b. Which activities can be done concurrently?
 - c. Which activities must be started immediately following a completed activity?
 - d. What major economic facility or manpower restrictions are required for sequencing these activities?

2. All paths through the Project schedules shall proceed in the direction representing the progression of time. Activity lag duration shall not have a negative value unless the Contractor substantiates to the satisfaction of the Owner that this is the best representation of reality. The use of activity lags shall be kept to a minimum. The Contractor shall eliminate lags by creating new activities, when the creation of new activities will perform the same function of the lag and when requested to do so by the Owner.
 3. Redundant ties to preceding activities in a sequential series of activities will not be permitted. For example, if activity C is the successor in a finish-start relationship to activity B, and activity B is the successor in a finish-start relationship to activity A, then activity A shall not have a redundant finish-start relationship to activity C. A tie representing a different constraint will not be considered redundant. For example, a logic tie showing that the completion of the work scope of a predecessor is required before the successor can start is different from a logic tie representing a resource limitation and will not be considered redundant.
 4. The Contractor is required to use manpower and equipment restraints, separately noted, to optimize and level manpower and equipment requirements. Such resource leveling shall reflect a reasonable plan for accomplishing the Work. The individual activities involved may be sequenced within the limits of the available Total Float. However, when this leveling technique is used in establishing the initial schedule, it shall be reflected in the logic with restraints identified as "restraint for manpower or equipment leveling purposes only." Critical or near Critical Paths resulting from the use of manpower restraints shall be kept to a minimum.
 5. All activities with resource restraints shall be supplemented with resource loading information as noted in Paragraph G.
 6. The Contractor shall correct all incorrect logic relationships in the Schedule Updates to eliminate any out-of-sequenced logic. The Contractor shall make all changes in the logic or other adjustments found to be incorrect by the Owner.
- O. Progress Data:** Actual start and finish dates shall not be automatically updated by default mechanisms that may be included in the CPM scheduling software systems. The primary source of actual starts and finishes and period percentage completes shall be by field verification. The Contractor is to insure that progress is based of a current estimate of remaining duration to complete the Work and not the activity percent complete which calculates the remaining duration based on the original estimated duration.
- P. Submittals:**
1. Each submission that is required by the Contract Documents shall have a corresponding activity, for the preparation and review and approval at the submission. When the Contractor plans on making a submission in parts, each part of the submission shall have corresponding preparation and review and approval activities.
 2. The timing, sequencing and duration of all submitted review and approval activities shall be in accordance with the Contract Documents.
 3. All submissions designated "Revise and Resubmit" shall require that the Contractor insert new submittal preparation and review and approved activities with appropriate logic into the schedule.
 4. When submittal receives a partial approval and the partial approval is sufficient to enable the commencement of a successor activity, then the original submittal activity shall be broken down into multiple activities as necessary to accurately reflect the logic of the Contractor's current plan.
 5. When multiple items are included in a single submittal, the "Review and Approve" activity for the submittal shall be a predecessor to every activity representing the fabrication and delivery of any of the materials.
- Q. Delivery Activities:** The schedules shall include activities for all fabrication and delivery work except for short lead time items. "Short lead time" shall be defined as a period of fourteen (14) days or less from placement of order to delivery of material to the project site. Activities representing the delivery of materials or equipment for more than one (1) installation activity will be permitted in accordance with the following conditions.
1. The material delivery activity shall be a predecessor to the first activity representing the installation of the material in each area.
 2. When partial deliveries are received and those deliveries are adequate to enable the commencement of some, but not all, successor activities, then the original delivery activity shall be broken down into multiple activities as necessary to accurately reflect the logic of the Contractor's current plan.
- R. Inspections/Testing:** The Contractor shall include an activity for each inspection and test required by the various officials and agencies, including the Building Inspector, and Fire Marshall. The Contractor shall schedule these activities in accordance with the availability of the corresponding agency/official.

- S. Progress Override/Retained Logic:** The Contractor shall use retained logic to calculate all schedules required by this section. The use of progress override is not allowed without prior approval of the Owner.
- T. Weather Days Allowance:** The Contractor shall include as a separate identifiable activity on the Critical Path, and activity labeled "Weather Days Allowance." Insert this activity immediately prior to the substantial completion milestone.
1. The Contractor shall be fully responsible for determining the number of weather delay days to be included in the CPM Schedule. This determination shall be based on the normal anticipated weather for the project location and the nature of the project work. The CPM Schedule shall be based on the contractor's determined weather delay allowance, immediately prior to the Substantial Completion milestone.
 2. The minimal allowed duration of the Weather Days Allowance shall be calculated as follows (decimals rounded to nearest whole number):
$$\frac{\text{Contract Time (Calendar Days)}}{365} \text{ multiplied by } 7 \text{ equals Weather Days Allowance (Calendar Days)}$$
 3. The Contractor shall insert an activity in the Critical Path to reflect weather day occurrences when weather days are experienced and accepted by the Owner. Identify this activity as a weather delay.
 4. The Contractor shall reduce duration of Weather Days Allowance activity as weather delays are experienced and inserted into the schedule. Remaining weather days in Weather Day Allowance at completion of project is considered float. Weather delay, when justified, are considered allowable, non compensable.
- U. Regulatory/Third Party Approvals:** The Contractor shall include activities in its schedule for all approvals required by regulatory agencies or other third parties.
- V. Resource Loading:** The Contractor shall resource load the schedules when required by this Specification and/or if requested to do so by the Owner. When required, the schedules shall be resource loaded for both the Contractor and all of its subcontractors as detailed below or as otherwise directed by the Owner. The Contractor may propose additional or alternative resource loading for the Owner review and acceptance. Defining a resource shall consist of identifying the resource name, resource description, unit of measure, and calendar assignment.
1. **Labor Resources:** Labor shall refer to all craft labor including foreman. Labor shall be measured in person-days. The labor resource definitions shall be consistent with the subcontractor work scope.
 2. **Construction Equipment Resources:** The planned use of equipment requiring a licensed operator shall be reflected in equipment resource assignments to activities.
 3. **Limits on Resources:** The Contractor shall indicate in its Narrative the expected amount of resource and shall define the normal or expected usage along with a maximum limit available to the Contractor. Resource limits may vary for different stages of the work. Resource limits shall be revised to reflect the Contractor's current plan for the timely completion of the work.
- W. Activity Logs:**
1. Activities that are modified or added by change order shall be identified in the activity log. The change order number, as issued by the Owner, and the date the activity was modified or added shall be clearly recorded.
 2. Activities affected by logic changes, resource changes, duration changes and calendar changes shall be identified in the activity log. The date the activity was modified, the nature of the change and the reason for the change shall be clearly recorded.

1.6 PRELIMINARY SCHEDULE AND PRELIMINARY SCHEDULE UPDATES

- A.** For projects with a construction cost estimate over five (5) million dollars, the Contractor shall submit a Preliminary Schedule and Preliminary Schedule Updates. The Notice to Proceed will not be issued and the Contractor will not be allowed to start work at the Project site until the Preliminary Schedule has been submitted and accepted.
- B.** The Preliminary Schedule shall contain a detailed plan of operations for the first 90 days of Work after receipt of the Notice to Proceed.
- C.** The Construction Administrator and Contractor shall meet after receipt of Preliminary Schedule to review and make necessary adjustments. Contractor shall submit a revised Preliminary Schedule incorporating the adjustments with five (5) days after meeting.

- D. All Work contemplated beyond the first ninety (90) days shall be shown in sufficient detail such that the Critical Path and all Contract Milestones may be identified.
- E. The Preliminary Schedule shall be updated monthly during first ninety (90) days after issuance of the Notice to Proceed. The first update of the Preliminary Schedule shall show the progress on the actual Notice to Proceed date and shall be submitted to the Construction Administrator within five (5) days after the issuance of the Notice to Proceed. Subsequent updates shall show the progress through the last day of the month and shall be submitted to the Construction Administrator by the fifth business day of each month.
- F. Preliminary Schedule Update revisions that are required as a result of review comments by the Construction Administrator shall be submitted within five (5) days of the Contractor's receipt of the Construction Administrator's comments. The data date of the revised Preliminary Schedule Update shall remain on the first day of the month.
- G. The Contractor shall not be permitted to make any schedule revisions (besides progress) to the Preliminary Schedule Update unless approved by the Construction Administrator. When schedule revisions are required, the Contractor shall submit a Schedule Revision per Article 1.11.

1.7 BASELINE SCHEDULE

- A. For projects with a construction cost estimate over five (5) million dollars, the Contractor shall submit the proposed Baseline Schedule to the Construction Administrator for all the work of the project within forty-five (45) days after issuance of the Notice to Proceed. The Accepted Preliminary Schedule shall be incorporated unchanged, as first ninety (90) days activity in the Contractor's Baseline Schedule.
- B. The proposed Baseline Schedule shall show sequence and interdependence of all activities required for complete performance of all Work, beginning with date of Notice to Proceed and concluding with date of final completion of the Contract. The Baseline Schedule shall depict the work as bid and as planned as of the Notice to Proceed. The data date shall be the actual date of the Notice to Proceed.
- C. The Construction Administrator and the Contractor shall meet after the Construction Administrator's receipt of the Baseline Schedule to review and make necessary adjustments. Should adjustments be required, the Contractor shall submit a revised Baseline Schedule within five (5) days after the meeting and receipt of the Construction Administrator's comments. Subsequent follow-up meetings and resubmissions may continue until the Construction Administrator accepts the Baseline Schedule.
- D. The Contractor shall require each major Trade Contractor and major supplier to submit in writing a statement certifying that the major Trade Contractor or major supplier has concurred with the Contractor's Baseline Schedule, the major Trade Contractor's or major supplier's related schedule has been incorporated accurately, including the duration of activities and crew allocations. The definition of a "major Trade Contractor" is **one (1)** that provides services valued in excess of **five (5) percent** of the Contract value. The definition of "major supplier" is **one (1)** that provides material(s) or services valued in excess of **one (1) percent** of the Contract value. Failure of the Contractor to provide the required information will delay the approval of the Baseline Schedule.

1.8 SCHEDULE UPDATES

- A. The Contractor shall update and progress the CPM Schedule through the last day of each month (the Data Date is the first day of the month). Updating and progressing the CPM Schedule shall be completed and submitted by the fifth business day each month. Except as otherwise authorized by the Construction Administrator, monthly submissions received after the due date are considered late.
- B. The first update will consist of the approved Baseline Schedule updated as of the first day of the first month which starts after ninety (90) days from the Notice to Proceed. Subsequent monthly Schedule Updates will be the previous month's approved Schedule Update or approved Revision Schedule updated to reflect progress over the last month. Schedule revisions, apart from updating the status of the remaining durations and percent completes of the various work activities will not be permitted in the Schedule Update.
- C. The Contractor shall create a copy of the previous month Schedule Update for the purpose of updating and progressing it. The schedule shall be updated to show the work actually accomplished during the preceding month, the actual time consumed for each activity, and the estimated time remaining for any activity that has been started but not completed. The updating of the percent complete and the remaining duration of any activity shall be independent functions; program features that calculate one of these parameters from the other shall be disabled.
- D. The Contractor shall make the necessary adjustments to the Schedule Update in accordance with the Construction Administrator's Schedule Update review comments and shall re-submit the Schedule Update within five (5) days after receipt of those comments.

- E. The Contractor shall prepare the monthly Schedule Updates every month starting on the month described above through the actual substantial completion date.

1.9 TWO-WEEK LOOK AHEAD SCHEDULES

- A. The Contractor shall be required to produce and submit to the Construction Administrator a Two-Week Look Ahead Schedule, to be updated and submitted the first day of each week. Except as otherwise authorized by the Owner, submissions received after the due date are considered late.
- B. The Two-Week Look Ahead Schedule may be a CPM schedule or a bar chart; it shall be consistent with the previously approved Schedule Update or approved Schedule Revision.

1.10 SCHEDULE REVISIONS

- A. If, at any time, the Contractor alters its logic, original durations, or descriptions, adds activities or activity codes, or in any way modifies the accepted Preliminary Schedule, accepted Preliminary Schedule Update, Baseline Schedule or Schedule Update, the Contractor must notify the Construction Administrator of the change(s), in writing and submit a Revision Schedule to the Construction Administrator for review.
- B. The preparation and submission of Revision Schedules will also be required to reflect any Contract Modifications that were approved and Construction Change Directives that were issued during the preceding period and any extra or changed work that the Contractor has started during the preceding period.
- C. With each Revision Schedule, the Contractor shall submit a written narrative explaining the nature of the change(s), the schedule, the reason for the change(s) and the impact on the schedule as a result of the change(s).
- D. All changes (i.e. duration changes, logic changes, new logic, new or modified activities changes in work sequence, etc.) shall be recorded and a note added to the activity log. The record shall include at a minimum, the date and the reason for the change, and description of the change.
- E. The required Revisions Schedules and Narratives are in addition to the regular Schedule Update. They shall be separate submittals and shall be noted as Schedule Revisions.
- F. Proposed Revision Schedules shall be submitted by the fifth day of the month and shall reflect status as of the first day of the month.
- G. The Construction Administrator and Contractor shall meet after the Construction Administrator's receipt of the Revision Schedule and Narrative to review and make necessary adjustments. Should adjustments be required, the Contractor shall submit a revised Revision Schedule to the Construction Administrator within five (5) days after the meeting and receipt of the Construction Administrator Comments. Subsequent follow-up meetings and resubmissions may continue until after the Construction Administrator accepts the Revision Schedule.
- H. Only upon acceptance of a revision to the Schedule by the Construction Administrator shall the revision be reflected in the next Schedule Update and Two-Week Look-Ahead Schedule.
- I. The Construction Administrator reserves the right to accept or reject any schedule revisions proposed by the Contractor.

1.11 RECOVERY SCHEDULES

- A. If, in opinion of the Owner, a Schedule Update indicates that the Contractor has fallen behind schedule, or that a revision in sequence or operations may be necessary for any other reason, the Contractor shall within seven (7) days of receiving a written request to perform "Recovery" from the Construction Administrator, immediately institute all necessary steps to improve his progress and shall submit such revised network diagrams, tabulations, operational plans and any supplementary information, as may be deemed necessary by the Owner, to demonstrate the manner in which an acceptance rate of progress will be regained.
- B. Should the Contractor's "Recovery" efforts not demonstrate an ability to regain an acceptable rate of progress, the Construction Administrator may require the development of a "Recovery Schedule" and the Contractor shall submit the Recovery Schedule within twenty-one (21) days of receiving a written request for the Recovery Schedule from the Construction Administrator. The Recovery Schedule is to be supplemented with resource allocations for every task activity and include time-scaled resource histograms. The resource allocations shall be shown to a level of detail that facilitates report generations based on labor crafts and equipment classes for the Contractor and Trade Contractors. The Contractor shall use average composite crews to display the labor loading of onsite construction activities. The Contractor shall optimize and level labor to reflect a reasonable plan for accomplishing the Work of the Contract and to assure that resources are not over allocated in multiple concurrent activities. The time-scaled resource histograms shall show labor crafts and equipment classes to be utilized on the Contract.

- C. In addition to required submittals, the "Recovery Schedule" submission will also include a Narrative as detailed herein, a time-scaled resource histogram and a Monthly Resources Loading Summary Report (tabular) indicating the peak number of resources required for each activity.
- D. The Construction Administrator shall be the sole judge as to whether the Recovery Schedule is sufficiently detailed. Upon acceptance of this Recovery Schedule, it shall form the basis of the new Monthly Schedule Updates going forward.
- E. No additional compensation will be allowed for Recovery Schedules required to overcome delays caused in whole or in part by the Contractor.

1.12 NARRATIVES

- A. The Contractor shall prepare and submit a Narrative to accompany the Baseline Schedule, Preliminary Schedule and each Preliminary Schedule Update and Monthly Schedule Update. The Narratives shall include:
 - 1. Identification of the update period, the data date and the schedule file name.
 - 2. A description of the current Critical and Near Critical Paths activities that are supposed to start or to be worked on over the coming month.
 - 3. Changes to the Critical Path, intermediate and completion Milestones
 - 4. Description of problem areas.
 - 5. Current or anticipated delays:
 - a. Cause of delay.
 - b. Impact of delay on other activities, Milestones, and completion dates.
 - c. Corrective action and schedule adjustments to correct the delay.
 - 6. A discussion of work completed during the period.
 - 7. A comparison of the planned versus schedule progress early on and near Critical Path activities that were to have been worked on over the last month.
 - 8. A description of any interdependencies between the Contractor's Schedule and any work by other contractors, third parties, and/or the Owner and its representatives.
 - 9. A description of the current status of float created by any previous or ongoing compensable or excusable delays, whether or not the Contractor has utilized any of this float over the last period by purposefully slowing down (pacing) and any request to utilize this float over the coming period.
 - 10. An explanation of how adverse weather has been addressed in Schedule and an accounting of the Weather Day Allowance delineating the activities incorporated into the Schedule to account of work days lost due to weather and the resultant decrease in the duration of the Weather Day Allowance.
 - 11. A description of planned labor resources to be utilized to complete critical and near Critical Path work as requested by the Construction Administrator.
 - 12. A description of actual and potential equipment resource limitations.

1.13 NETWORK FILES, GRAPHICAL OUTPUT AND REPORTS

- A. With each Preliminary Schedule, Preliminary Schedule Update, Baseline Schedule, Schedule Update, Revision Schedule and Recovery Schedule required by these specifications, the Contractor shall submit to the Construction Administrator the following schedule reports/graphics/files:
 - 1. Three (3) compact disc sets that each include:
 - a. A compressed back up of the entire schedule.
 - b. Gantt charts in Adobe Acrobat PDF file format, formatted to fit ANSI Size D paper (610mm x 914mm) (24" x 36"), and showing the Activity ID, Activity Description, Original Duration, Remaining Duration, Total Float, Early Start and Finish Dates, and Calendar ID. Types of Gantt Charts to be included are:
 - i. The project critical (longest) path.
 - ii. The Project near Critical Path (excluding Critical Path activities).
 - iii. All uncompleted work activities as of the data date.
 - 2. Reports in Adobe Acrobat PDF file format, formatted to fit 216mm x 279mm (8½" x 11") size paper, to include:

- a. A listing of all activities, by activity code, with early & late starts and Total Float.
 - b. A Claim Digger Report that details all changes between the current schedule submittal and the previous month's update submittal.
 - c. Detailed Predecessor/Successor Report which included a listing of all activities that immediately precede and immediately succeed that activity in the schedule logic.
3. Three (3) paper copies of each Gantt Charts in color and report on the paper size specified above.
- B. Schedule submittals will only be considered complete when all materials have been submitted.

1.14 FLOAT/CRITICAL PATH

- A. With the exception of the Float described in Paragraphs B and C, Float is not for the exclusive use or benefit of either the Construction Administrator or the Contractor but is an expiring resource available to all parties acting in good faith as needed to meet any Contract Milestone(s).
- B. As float is an expiring resource, if the Work is delayed on the Critical Path due to an excusable delay (either compensable or non-compensable) or by any delay for which responsibility has not yet been agreed upon, the Contractor may not use any float created by such delay on any other path without the express written approval of the Construction Administrator or unless at the time of the float consumption a time extension had been issued for the delay that created the float being consumed. Use of such float on any parallel path without the approval of the Construction Administrator shall be construed as a concurrent inexcusable delay to any delay caused by the Construction Administrator.
- C. It is acknowledged and agreed by the Contractor that Construction Administrator caused delays on the project may be offset by Construction Administrator caused time savings (including, but not limited to: Critical Path submittals returned in less time than allowed for in the Contract, approval of substitution requests which result in a savings of time along the Critical Path for the Contractor, etc.). In such an event, the Contractor shall not be entitled to receive an extension of time or delay damages until the Construction Administrator caused time savings are exceeded and the Contract completion date also exceeded.

1.15 EARLY COMPLETION

- A. Should Contractor submit a Preliminary Schedule, Baseline Schedule, Schedule Update or Schedule Revision showing Project Completion more than twenty (28) days prior to Contract Completion Date, the Construction Administrator may issue a Change Order, at no cost to Owner, revising the time of performance of Work and Contract completion date to match Contractor's schedule. Contract Milestone dates, if any, shall be adjusted accordingly. The assessment of liquidated damages shall be measured based on the new Milestone and Contract completion dates.
- B. Should any monthly Schedule Update show the project completion earlier than current Contract completion date, the Contractor shall show early completion time as schedule activity, identified as "Project Float." This float shall be available for use by either party as per the provisions of Article 1.14. The Owner shall not liable for any damages as a result of utilizing this float.

1.16 CONTRACT TIME EXTENSIONS

A. Mitigation of Delays:

1. The Contractor shall be responsible to develop mitigation measures for all delays regardless of responsibility for the delays and to identify all time and cost impacts to the work associated with those mitigation measures. Unless circumstances otherwise require, the Contractor shall not pursue mitigation action for which it expects the Owner to be liable prior to notifying the Owner and receiving Construction Administrator authorization to proceed with the mitigation action. Any action taken by the Contractor prior to receiving approval from the Construction Administrator shall be at the Contractor's risk.
2. When the need for mitigation arises to ensure timely completion, the Contractor shall review all uncompleted activities on the Critical and Near Critical Paths to the Contract Completion Date for errors in scope, duration, and logic and for the feasibility of performing in parallel work currently scheduled sequentially.
3. Whenever it is possible for the Contractor to mitigate delay without added cost, the Contractor shall do so. The Contractor shall mitigate all delays as efficiently and economically as possible, with the objective of minimizing both the time and cost impact of the delay regardless of responsibility for the delay. The Owner will not be liable for damages which the Contractor could have avoided by reasonable means such as prudent scheduling of the work and judicious handling of forces, equipment or plant. The Owner will not be liable for damages incurred by the Contractor during any period of time when the Contractor has

failed to provide notification of delay in accordance with the Contract requirements when having the notification at the specified time could have influenced the Owner's decision or actions.

B. Time Impact Analysis:

1. If the Contractor believes that a proposed change will impact the Project Completion Date or interim Milestones, the Contractor shall submit an analysis with its Change Order Proposal demonstrating the delay to the Critical Path. This analysis shall be in the form of a Time Impact Analysis (TIA).
2. The Time Impact Analysis shall consist of: 1) a Fragnet of the portion of the schedule that will be affected by the incorporation of the change, which shall include the new activities, revised logic and durations associated with the proposal change; 2) a narrative explanation of how the proposed change would impact the schedule; 3) an impact schedule which shall be developed by incorporating the Fragnet and required changes, including any delay mitigation measures, into the most recent accepted schedule update and; 4) electronic copies of the Fragnet and impact schedule.
3. The Contractor shall submit its TIA in sufficient time to allow it to be incorporated into a Revision Schedule prior to the change order work proceeding, allowing the Owner thirty (30) days after receipt of the TIA and all the supporting information required with the Change Order Proposal to approve or reject the analysis.
4. Upon agreement on the schedule impact due to the proposed change and the issuance of a time extension, the Contractor shall incorporate the agreed upon Fragnet/schedule revisions in the next monthly update.
5. The Owner reserves the right to have the Contractor proceed with the change order related work without agreeing on the time associated with it and to measure the actual schedule impact via Contemporaneous Period Analysis.
6. In cases where the Contractor has not submitted a TIA with its Change Order Proposal for a particular proposed change, the Contractor agrees that the particular proposed change has no impact on the Contract Completion Date or interim Milestones and no time extension is required.

C. Contemporaneous Period Analysis:

1. When an accepted Schedule Update indicates the project has been delayed beyond the current Contract Completion Date and the Contractor believes it is entitled to an extension of time, the Contractor shall prepare and submit to the Owner a Contemporaneous Period Analysis (CPA) demonstrating the delay(s) to the Critical Path at the time of the delay, mitigation measures taken or proposed by the Contractor and request an extension of time.
 2. The Contractor's CPA and time extension request shall be submitted prior to the submission of the next Schedule Update.
 3. The request shall indicate the amount of time requested, the period when the delay was experienced and an explanation as to the cause of the delay.
 4. The CPA shall quantify the delay by comparing the completion dates and Milestone dates on an update by update basis, starting with the update just prior to the delaying event and ending with the update just after the conclusion of the delaying event. Only the accepted schedules/Schedule Updates shall be used in the CPA. The CPA shall determine the cause of the delay by correlating slippage with various unforeseen events.
 5. The CPA will consist of: 1) an update by update accounting of all delay(s) during the period in question; 2) an update by update narrative explanation of how the delay(s) affected the completion date or would have affected the completion date but for other concurrent delay(s); 3) chronologies of the issues affecting the schedule period in question; and 4) a day by day accounting and description of the unanticipated work/work stoppage on the Critical Path and/or path in question; 5) a Gantt chart comparing the as-planned schedule just prior to the start of the delay to the actual as-built for the path(s) in question.
- D.** The Owner may require the Contractor to correct errors in its TIA or CPA at anytime, whether or not the schedules have been accepted and/or time extension issued and agreed upon. Should the errors affect the outcome of the TIA or CPA, the Owner reserves the right to adjust the time extension accordingly. Generally, a schedule will be found to be in error if it does not properly reflect the sequencing, timing and durations of all the work and required events as well as mitigation efforts contemplated or which should have been contemplated at the time of the data date of the schedule.
- E.** Time Extensions will be granted only to the extent that equitable adjustments for the activity or activities affected exceed or exceeded the total or remaining float along the Critical path or activities at the time of the actual delay. Actual delays in activities which do not affect the Critical Path work or which do not move the Contractor's planned completion date beyond the Contract completion date or current completion date as

- affected by previous delays, will not be the basis for an adjustment to the Contract time. Time Extensions shall not be granted until a delay occurs that is:
1. Beyond control of and without fault of or negligence of the Contractor and the major Trade Contractors or Suppliers at any time.
 2. Extends the actual performance of the work beyond the Contract completion date or other specified Interim Milestones.
- E. Should a non-compensable excusable delay be concurrent with one or more compensable delays, the Contractor and Owner agree that the net result is a non-compensable, excusable delay to the extent the delay is caused by the non-compensable event.
- F. The Contractor shall have no claim for damages of any kind, or extensions or increase to the Contract time(s) or Contract Milestone(s), or adjustments of Contract Price on account of any delay, interruption or suspension of the Work or any portion thereof (herein after collectively referred to as "Delay"), due to whatever cause unless the prerequisites of this Subsection are met. The requirements of this Subsection are in addition to and not in lieu of the requirements of any other applicable subsection.

1.17 REVIEW AND ACCEPTANCE OF PROJECT SCHEDULE SUBMITTALS

- A. The Construction Administrator shall review schedule submittals for conformance with the requirements of the Contract Documents. Schedule review comments by the Construction Administrator may address whether items of Work are omitted, activity durations are reasonable or that the level of labor, materials, and equipment, the means, methods, timing, and sequencing of the Work are practicable. The planning, scheduling or execution of the Work and the accuracy of any Project Schedule shall remain the sole responsibility of the Contractor.
- B. During the review of any of the submissions required by this section, if any of the following conditions are discovered the submittal shall be returned by the Construction Administrator without further review for correction and re-submittal:
1. The submittal is incomplete.
 2. The submittal does not comply with the specified format.
 3. A component of the submittal has not been prepared in accordance with all of the requirements of this section.
 4. The quality of the submittal indicates that the Contractor has failed to perform an internal quality control review prior to submission.
 5. There is an inconsistency between electronic files and printed material.
- C. It is the Contractor's responsibility to ensure that all Project Schedules are in compliance with all of the requirements of the Contract Documents. The Construction Administrator's failure to return a submittal shall not be construed to mean that the submittal is in compliance with the requirements of the Contract Documents. The Construction Administrator, at its discretion, may choose to complete a submittal review even though the submittal fails to meet one of more of the conditions for rejection stated herein.
- D. The acceptance of any Project Schedule by the Construction Administrator does not constitute acceptance or approval of any change to the requirements of the Contract Documents including but not limited to any mandated construction sequences. The Construction Administrator is not responsible for any erroneous assumptions or information in any Project Schedules regardless of origin.
- E. The Contractor shall be responsible for all delays due to its failure to submit complete submittals in accordance with the requirements of the Contract Documents.
- F. The Schedule submitted will not be considered acceptable until all of the Construction Administrator's comments are incorporated into the schedule to the Construction Administrator's satisfaction.
- G. Errors in any Project Schedule accepted by the Construction Administrator, including but not limited to activity durations, relationships between activities, resource allocation or other float suppression techniques that do not accurately reflect the work may be identified at any time and once identified shall be corrected by the Contractor.
- H. Construction Administrator's acceptance of a Schedule Update shall not constitute the approval of a time extension should the Project Completion Date or Contract Milestone(s) be shown as delayed.
- I. Notwithstanding any review, review comments, acceptance, scheduling assistance or direction to change an/or revise any schedule by the Construction Administrator, the schedules shall at all times be the Contractor's schedule for performing the Work and not be considered as any Construction Administrator

direction constituting a change unless the Contractor gives appropriate notice and the other Contract provisions for determining merit and entitlement are met.

1.18 PAYMENT

- A. When the Contractor submits its schedule of values in accordance with the General Conditions, it shall include an amount for the scheduling work associated with this section, this cost to be paid in accordance with section (01 29 76).
- B. Failure of the Contractor to submit a Baseline Schedule or Revised Baseline Schedule for any portion of the work in accordance with this specification may result in the withholding all Contract payment until the schedule is submitted to, and accepted for compliance with the specification and reasonableness, by the Construction Administrator.
- C. In the event the project extends beyond the original completion date by more than 30 days, and a time extension is granted to the Contractor, the Construction Administrator may require additional CPM updates which will be paid at the per month cost for the Scheduling Update services.

1.19 DISTRIBUTION

- A. Distribute copies of the computer generated schedules to Construction Administrator, Architect, Owner, Subcontractors, suppliers, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problem anticipated by projections indicated in schedules.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 32 16.13

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A.** Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A.** This Section includes administrative and procedural requirements for construction photographs.
- B.** Related Sections: The following Section contains requirements that relate to construction photographs:
 - 1. Division 01 Section 01 33 00 "Submittal Procedures" specifies general requirements for submitting digital construction photographs.

1.3 SUBMITTALS

- A.** Photographs: Provide a digital camera to take twenty-four (24) or more photos each time. Deliver two (2) sets of photo files on one (1) CD-ROM and one (1) set of prints (8x10) to the Construction Administrator for the Department.
- B.** Extra Sets: When requested by the Owner, the photographer shall prepare extra sets of prints or CD-ROM. The photographer shall distribute these directly to the designated parties who will pay the costs for the extra sets directly to the photographer.

1.4 QUALITY ASSURANCE

- A.** Engage a qualified commercial photographer to take photographs during construction.
- B.** Photographer's Qualifications: Photographer shall be an individual of established reputation who has been regularly engaged as a professional photographer for not less than three (3) years.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC COPIES

- A.** On the date the work is begun and every thirty (30) days thereafter (until the work is at least 95 percent complete), the Contractor shall have digital photographs of the construction taken by a professional photographer.
- B.** Identification: Label each CD-ROM with project name and date the photographs were taken. With each submittal provide an applied label, rubber-stamped or index sheet with the following information:
 - 1. Name of the Project.
 - 2. Name and address of the photographer.
 - 3. Name of the Architect.
 - 4. Name of the Contractor.
 - 5. Date the photographs were taken.
 - 6. Vantage Point: Description of vantage point, in terms of location, direction (by compass point), and elevation or story of construction.

PART 3 – EXECUTION

3.1 PRECONSTRUCTION PHOTOGRAPHS

- A.** Before starting construction, take digital photos of the site and surrounding properties from different points of view, as selected by the Construction Administrator.
 - 1. Take digital photos in sufficient number to show existing site conditions before starting Work.
 - 2. Take digital photos of adjacent existing buildings either on or adjoining the property in sufficient detail to record accurately the physical conditions at the start of construction.

3.2 PHOTOGRAPHIC REQUIREMENTS

- A. Take twenty-four (24) or more digital photographs monthly, coinciding with the cutoff date associated with each Application for Payment. The Construction Administrator shall select the vantage points for each shot to best show the status of construction and progress since the last photos were taken.
- B. As the digital photographs are a record of the work progress, they shall be taken each month, whether or not they show work done during the preceding month. Deliver the CD-ROMs and prints within ten (10) days of their taking.
- C. Provide and coordinate the use of photographic software to assure that the photos are viewable by all interested parties.

- D. PART 2 - PRODUCTS (Not Applicable)

- E. PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 32 33

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submittals required for performance of the Work, including but not limited to the following:
 - 1. Submittal schedule.
 - 2. Shop Drawings.
 - 3. Product Data.
 - 4. Samples.
 - 5. Quality assurance submittals.
 - 6. Proposed "Substitutions/Equals".
 - 7. Warrantee samples.
 - 8. Coordination Drawings.
 - 9. O & M Manuals
- B. Administrative Submittals: Refer to other Division 01 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:
 - 1. Permits.
 - 2. Applications for Payment.
 - 3. Performance and payment bonds.
 - 4. Contractor's construction schedule.
 - 5. Daily construction reports.
 - 6. Construction Photographs.
 - 7. Insurance certificates.
 - 8. List of subcontractors.
 - 9. Subcontractors/Suppliers FEIN number's and Connecticut tax registration number.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section 01 25 00 "Substitution Procedures" specifies requirements for submittal of requests for equals and substitutions.
 - 2. Division 01 Section 01 29 76 "Progress Payment Procedures" specifies requirements for submittal of the Schedule of Values.
 - 3. Division 01 Section 01 31 00 "Project Management and Coordination" specifies requirements governing preparation and submittal of required Coordination Drawings.
 - 4. Division 01 Section 01 31 19 "Project Meetings" specifies requirements for submittal and distribution of meeting and conference minutes.
 - 5. Division 01 Section 01 32 16 "Construction Progress Schedules" for requirements for construction scheduling and reporting progress of work.
 - 6. Division 01 Section 01 32 33 "Photographic Documentation" specifies requirements for submittal of periodic construction photographs.
 - 7. Division 01 Section 01 35 26 "Government Safety Requirements" specifies the requirements for safety plans, reports, and investigation submittals.
 - 8. Division 01 Section 01 45 00 "Quality Control" specifies requirements for submittal of inspection and test reports and mockups.

9. Division 01 Section 01 45 23.13 "Testing for Indoor Air Quality (IAQ), Baseline IAQ, and Materials" specifies requirements for submittal of documentation required to support LEED or Green Globes certification.
10. Division 01 Section 01 77 00 "Closeout Procedures" specifies requirements for submittal of Project Record Documents and warranties at project closeout.
11. Division 01 Section 01 78 30 "Warranties and Bonds".
12. Division 01 Section 01 81 13 "Sustainable Design Requirements" specifies requirements for submittal of documentation required to support LEED or Green Globes certification.
13. Division 01 Section 01 91 00 "Commissioning" specifies requirements for submittal of quality assurance documentation related to commissioning.

1.3 DEFINITIONS

- A. Coordination Drawings show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or to function as intended and as identified in the Specification Divisions 02 through 49.
 1. Preparation of Coordination Drawings is specified in Division 01 Section 01 31 00 "Project Management and Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.
- B. Field samples are full-size physical examples erected on-site to illustrate finishes, coatings, or finish materials. Field samples are used to establish the standard by which the Work will be judged.
- C. Mockups are full-size assemblies for review of construction, coordination, testing, or operation; they are not Samples.

1.4 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
 - a. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
 - b. The Architect reserves the right to reject incomplete submitted packages.
 3. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for re-submittals.
 - a. Allow fourteen (14) days for initial review. Allow additional time if the Architect must delay processing to permit coordination with subsequent submittals.
 - b. If an intermediate submittal is necessary, process the same as the initial submittal.
 - c. Allow fourteen (14) days for reprocessing each submittal.
 - d. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.
- B. Submittal Preparation: Place a permanent label, title block or 8-1/2 inches x 11 inches cover page approved by the Architect, on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
 1. The minimum number of copies required for each submittal shall be seven (7) or as determined otherwise at the pre-construction conference or by the Construction Administrator.
 2. Provide a space approximately 4 inches by 5 inches on the label, beside the title block or on the cover page on Shop Drawings to record the Contractor's review and approval markings and the action taken.
 3. Include the following information on the label for processing and recording action taken.
 - a. Project Name and State of Connecticut Project Number.
 - b. Date.
 - c. Name and address of the Architect, Construction Administrator, and Owner Representative.

- d. Name and address of the Contractor.
 - e. Name and address of the subcontractor.
 - f. Name and address of the supplier.
 - g. Name of the manufacturer.
 - h. Number and title of appropriate Specification Section.
 - i. Drawing number and detail references, as appropriate.
 - j. Indicate either initial or resubmittal.
 - k. Indicate deviations from Contract Documents.
 - l. Indicate if "equal" or "substitution".
- C.** Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the Architect using a transmittal form. Copy the Construction Administrator on the transmittal. The Architect will return all submittals to the Contractor after action is taken with a complete copy of the submittal package and one complete copy of the submittal package. The Architect will not accept submittals received from sources other than the Contractor.
- 1. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.

1.6 SUBMITTAL SCHEDULE

- A.** After development and review by the Owner and Architect acceptance of the Contractor's Construction or CPM schedule prepare a complete schedule of submittals. Submit the schedule to the Construction Administrator within thirty (30) days of Contract Award.
- 1. Coordinate Submittal Schedule with the list of subcontracts, Schedule of Values, and the list of products as well as the Contractor's Construction or CPM Schedule.
 - 2. Prepare the schedule in chronological order. Provide the following information:
 - a. Schedule date for the initial submittal.
 - b. Related section number.
 - c. Submittal category (Shop Drawings, Product Data, or Samples).
 - d. Name of Subcontractor.
 - e. Description of the part of Work covered.
 - f. Scheduled date for resubmittal.
 - g. Scheduled date for the Architect's final release of approval.
- B.** Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or modifications to submittals noted by the Architect and additional time for handling and reviewing submittals required by those corrections.
- 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's Construction or CPM Schedule.
 - 2. Initial Submittal: Submit concurrently with start-up construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
- C.** Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
- 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Submit all submittal items required for each specification section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.

3. Submit action submittals and informational submittals required by the same specification section as separate packages under separate transmittals.
 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- D. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow fifteen 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination with related submittals not yet received. Additional time will be required if processing must be delayed to permit review of related subsequent submittals.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow fifteen 15 days for review of each resubmittal.
 4. Mass Submittals: Six (6) or more submittals in one (1) day or twenty (20) or more submittals in one (1) week. If "Mass Submittals" are received, Architect's review time stated above may be extended as necessary to perform proper review. Architect will review "Mass Submittals based upon priority determined by Architect after consultation with Owner and Contractor.
- E. Distribution: Following response to the initial submittal, print and distribute copies to the Construction Administrator, Architect, Owner, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the Project meeting room and field office.
1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
- A. Schedule Updating: Revise the schedule after each meeting or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

1.7 DAILY CONSTRUCTION REPORTS

- A. Prepare a daily construction report recording the following information concerning events at the site, and submit duplicate copies to the Construction Administrator at weekly intervals:
1. List of subcontractors at the site.
 2. Approximate count of personnel at the site.
 3. High and low temperatures, general weather conditions.
 4. Accidents and unusual events.
 5. Meetings and significant decisions.
 6. Stoppages, delays, shortages, and losses.
 7. Meter readings and similar recordings.
 8. List of equipment on site and identify if idle or in use.
 9. Orders and requests of governing authorities.
 10. Change Orders received, start and end dates.
 11. Services connected, disconnected.
 12. Equipment or system tests and startups.
 13. Partial Completion's, occupancies.
 14. Substantial Completion's authorized.
 15. Equals or Substitutions approved or rejected.

1.8 SHOP DRAWINGS

- A. Submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information

- as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.
- B. Shop Drawings include fabrication and installation Drawings, setting diagrams, schedules, patterns, templates and similar Drawings. Include the following information:
 - 1. Dimensions.
 - 2. Identification of products and materials included by sheet and detail number.
 - 3. Compliance with specified standards.
 - 4. Notation of coordination requirements.
 - 5. Notation of dimensions established by field measurement.
 - 6. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 36 by 48 inches.
 - 7. Submit one (1) reproducible media and seven (7) prints as directed by the Construction Administrator. The Contractor's submittal shall identify the specification section and/or drawing number applicable to the submittal.
 - 8. Details shall be large scale and/or full size.
 - C. The Contractor shall review the Shop Drawings, stamp with this approval, and submit them with reasonable promptness and in orderly sequence so as to cause no delay in his Work or in the Work of any subcontractor. Shop Drawings shall be properly identified as specified for item, material, workmanship, and project number. At the submission, the Contractor shall inform the Architect, in writing of any deviation in the shop drawings from the requirements of the Contract Documents.
 - D. The Architect will review and comment on shop drawings with reasonable promptness so as to cause no delay, but only for conformance with the design concept of the project and with the information given in the Contract Documents. Refer to Article 5 of the General Conditions. Shop Drawings received by the Architect that indicate insufficient study of drawings and specifications, illegible portions or gross errors, will be rejected outright. Such rejections shall not constitute an acceptable reason for granting the Contractor additional time to perform the work.
 - E. The Contractor shall make any corrections required by the Architect and shall resubmit the required number of corrected copies of Shop Drawings until fully reviewed.
 - F. Upon final review submit four (4) additional prints, same as submitted, for use by the Construction Administrator.
 - G. The Architect's review and comments on Shop Drawings shall not relieve the Contractor of responsibility for any deviation from the requirements of the Contract Documents.
 - H. Only final reviewed Shop Drawings are to be used on the Project site.
 - I. The Work installed shall be reviewed in accordance with the Shop Drawings and the drawings and specifications. Final Review of the Shop Drawings by the Architect shall constitute acceptance by the State and the Architect of a variation or departure that is clearly identified. If the contractor believes notations made by the A/E increases the value or scope of the CD's, the contractor must provide written notice to the CA within seven (7) days of this issue. Final reviewed Shop Drawings shall not replace or be used as a vehicle to issue or incorporate change orders or substitutions. Substitutions shall be submitted in accordance with Division 01 Section 01 25 00 "Substitution Procedures".

1.9 SHOP DRAWINGS FOR FIRE PROTECTION SYSTEMS:

- A. Shop drawings for fire protection systems shall comply with all of the requirements in the section above "Shop Drawings". In addition Sprinkler system shop drawings and hydraulic calculations must be stamped by a professional engineer licensed in the state of Connecticut and must include the DAS/CS project number. Two (2) sets of information [as noted in this Section 01 33 00 "Submittal Procedures"] shall be submitted to the State's Insurance Carrier (SIC), and one (1) set shall be submitted to the Office of the State Fire Marshal (OSFM):
 - 1. Office of State Fire Marshal:
CT Department of Administrative Services
Construction Services
Office of State Fire Marshal
450 Columbus Boulevard, Suite 1304
Hartford, Connecticut 06103
Phone: (860) 713-5750

2. State Insurance Carrier (SIC):
FM Global Boston Operations
Plan Review
1175 Boston-Providence Turnpike
PO Box 9102
Norwood, MA 02062
Tel: (781) 440-8241 or FAX (781) 440-8742
bostonleadengineer@fmglobal.com
 - B. Before the shop drawings are submitted to SIC or OSFM, the A/E's fire protection consultant must review the sprinkler design for compliance with the code, OSFM, and FM Global requirements.
 - C. The State Insurance Carrier requires two (2) weeks prior notice of a sprinkler system acceptance test.
- 1.10 SHOP DRAWINGS FOR ROOFING SYSTEMS:
- A. Construction Phase Requirements: During product submittals and shop drawing review for Roofing Systems the Consultant shall verify FM Global requirements are satisfied for all relevant components. The DAS/CS PM and Construction Administer for the Project shall submit the Contractor's roofing systems product information and shop drawings to the Consultant and FM Global. Shop drawings for roofing systems shall comply with all of the requirements in the section above "Shop Drawings". Two (2) sets of information [as noted in this Section 01 33 00 "Submittal Procedures"] shall be submitted to the State's Insurance Carrier (SIC):
 1. State Insurance Carrier (SIC):
FM Global Boston Operations
Plan Review
1175 Boston-Providence Turnpike
PO Box 9102
Norwood, MA 02062
Tel: (781) 440-8241 or FAX (781) 440-8742
bostonleadengineer@fmglobal.com
 - B. The State Insurance Carrier requires two (2) weeks prior notice of roofing system shop drawing reviews.
 - C. See Section 00 30 60 General Statement For FM Global Checklist For Roofing Systems and Section 50 60 00 FM Global Checklist for Roofing Systems.
- 1.11 PRODUCT DATA
- A. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information, schedules, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves.
 1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information. Include the following information:
 - a. Manufacturer's printed recommendations.
 - b. Compliance with trade association standards.
 - c. Compliance with recognized testing agency standards.
 - d. Application of testing agency labels and seals.
 - e. Notation of dimensions verified by field measurement.
 - f. Notation of coordination requirements.
 2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
 3. Preliminary Submittal: Submit a preliminary single copy of Product Data where selection of options is required.
 4. Submittals: Submit seven (7) copies of each required submittal; submit five (5) copies where required for maintenance manuals. The Architect will retain one (1) and will return the other marked with action taken and corrections or modifications required.
 - a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.

5. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.
 - a. Do not proceed with installation until a copy of Product Data is in the Installer's possession.
 - b. Do not permit use of unmarked copies of Product Data in connection with construction.

1.12 SAMPLES

- A. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.
 1. Store, mount or display Samples on site in the manner to facilitate review of qualities indicated. Prepare Samples to match the Architect's sample. Include the following:
 - a. Specification Section number and reference.
 - b. Generic description of the Sample.
 - c. Sample source.
 - d. Product name or name of the manufacturer.
 - e. Compliance with recognized standards.
 - f. Availability and delivery time.
 2. Submit Samples for review of size, kind, color, pattern, and texture. Submit Samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
 - a. Where variation in color, pattern, texture, or other characteristic is inherent in the material or product represented, submit at least three (3) multiple units that show approximate limits of the variations.
 - b. Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
 - c. Refer to other Sections for Samples to be returned to the Contractor for incorporation in the Work. Such Samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of Sample submittals.
 - d. Samples not incorporated into the Work, or otherwise designated as the Owner's property, are the property of the Contractor and shall be removed from the site prior to Substantial Completion.
 3. Preliminary Submittals: Submit a full set of choices where Samples are submitted for selection of color, pattern, texture, or similar characteristics from a range of standard choices, unless otherwise noted in specification section.
 - a. The Architect will review and return preliminary submittals with the Architects notation, indicating selection and other action.
 4. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit three (3) sets. The Architect will return one (1) set marked with the action taken.
 5. Maintain sets of Samples, as returned, at the Project Site, for quality comparisons throughout the course of construction.
 - a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
 - b. Sample sets may be used to obtain final acceptance of the construction associated with each set.
- B. Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.
 1. Field samples are full-size examples erected on-site to illustrate finishes, coatings, or finish materials and to establish the Project standard.
 - a. Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

1.13 QUALITY ASSURANCE SUBMITTALS

- A.** Submit quality-control submittals, including design data, certifications, manufacturer's instructions, manufacturer's field reports, and other quality-control submittals as required under other Sections of the Specifications.
- B.** Certifications: Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements, submit a notarized certification from the manufacturer certifying compliance with specified requirements.
 - 1. Signature: Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the company.
- C.** Inspection and Test Reports: Requirements for submittal of inspection and test reports from independent testing agencies are specified in Division 01 Section 01 45 00 "Quality Control."

1.14 ARCHITECT'S ACTION

- A.** Except for submittals for the record or information, where action and return is required, the Architect will review each submittal, mark to indicate action taken, and return promptly.
 - 1. Compliance with specified characteristics is the Contractor's responsibility.
- B.** Action Stamp: The Architect will stamp each submittal with a uniform, action stamp. The Architect will mark the stamp appropriately to indicate the action taken, as follows:
 - 1. Final Unrestricted Release: When the Architect marks a submittal "Approved for fabrication," the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
 - 2. Final-But-Restricted Release: When the Architect marks a submittal "Incorporate Notations," the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Submit corrected copies for record. Final payment depends on that compliance.
 - 3. Returned for Resubmittal: When the Architect marks a submittal "Rejected, or Revise and Resubmit," do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary to obtain different action mark.
 - a. Do not use, or allow others to use, submittals marked "Rejected, or Revise and Resubmit" at the Project Site or elsewhere where Work is in progress.
 - 4. Other Action: Where a submittal is for information or record purposes or special processing or other activity, the Architect will return the submittal marked "Action Not Required."
- C.** Unsolicited Submittals: The Architect will discard unsolicited submittals without action.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 33 00

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Documents and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section

1.2 SUMMARY

- A. This guide specification covers construction safety requirements and requirements for the protection of people, property, and resources. It is intended for use in construction, renovation, and demolition projects for the State of Connecticut Department of Administrative Services (DAS) / Construction Services (CS).
- B. Related Sections: The following Sections contain requirements that relate to this Section:
1. Division 01 Section 01 33 00 Submittal Procedures specifies the requirements for submittal requirements;
 2. Division 01 Section 01 31 19 "Project Meetings" specifies requirements for submittal and distribution of meeting and conference minutes.

1.2 REFERENCES

- A. 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.

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| AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE) www.asse.org/publications/ | |
| ASSE/SAFE A10.32 | (2004) Fall Protection |
| ASSE/SAFE A10.34 | (2001; R 2005) Protection of the Public on or Adjacent to Construction Sites |
| ASSE/SAFE Z359.1 | (2007) Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components |
| AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) www.asme.org/Codes/ | |
| ASME B30.22 | (2005) Articulating Boom Cranes |
| ASME B30.3 | (2004) Construction Tower Cranes |
| ASME B30.5 | (2004) Mobile and Locomotive Cranes |
| ASME B30.8 | (2004) Floating Cranes and Floating Derricks |
| NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) www.nfpa.org/ | |
| NFPA 10 | (2007) Portable Fire Extinguishers |
| NFPA 51B | (2009) Standard for Fire Prevention During Welding, Cutting, and Other Hot Work |
| NFPA 241 | (2004) Safeguarding Construction, Alteration, and Demolition Operations |
| NFPA 70 | (2008) National Electrical Code |
| NFPA 70E | Standard for Electrical Safety in the Workplace |
| CODE OF FEDERAL REGULATIONS (CFR) www.archives.gov/federal-register/cfr/ | |
| 10 CFR | Standards for Protection Against Radiation |
| 29 CFR 1910 | Occupational Safety and Health Standards |
| 29 CFR 1910.28 | Safety Requirements For Scaffolding. |
| 29 CFR 1910.146 | Permit-required Confined Spaces |
| 29 CFR 1910.147 | Control Of Hazardous Energy (Lockout/Tagout) |
| 29 CFR 1910.178 | Powered industrial trucks. |
| 29 CFR 1915 | Confined and Enclosed Spaces and Other |
| 29 CFR 1926 | Safety and Health Regulations for Construction |
| 29 CFR 1926.500 | Fall Protection |
| 29 CFR 1926.550 | Cranes and Derricks |

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|---|--|
| US Army Core of Engineers (USACE) www.iwr.usace.army.mil | |
| EM 385-1-1 | Safety, and Health Requirements Manual (2008), |

1.3 SUBMITTALS

- A. An "O" followed by "A" indicates that the Owner acceptance; submittals not having an "O" designation are for Contractor Quality Control approval.
- B. Submittal Procedures:
 - 1. Preconstruction Submittals:
 - a. Accident Prevention Plan (APP): "O, A";
 - b. Activity Hazard Analysis (AHA): "O, A";
 - c. Crane Critical Lift Plan; "O, A";
 - d. Proof of qualification for Crane Operators; O, A.
 - 2. Test Reports: Submit reports as their incidence occurs, in accordance with the requirements of the paragraph entitled, "Reports."
 - a. Accident Reports;
 - b. Monthly Exposure Reports;
 - c. Crane Reports;
 - d. Regulatory Citations and Violations;
 - e. Gas Protection.
 - 3. Certificates:
 - a. Confined Space Entry Permit;
 - b. Hot work permit;
 - c. License Certificates.
 - d. Certificate of Compliance – Crane

1.4 DEFINITIONS

- A. Competent Person. A competent person is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.
- B. Competent Person for Fall Protection. A person who is capable of identifying hazardous or dangerous conditions in the personal fall arrest system or any component thereof, as well as their application and use with related equipment, and has the authority to take prompt corrective measures to eliminate the hazards of falling.
- C. Confined Space: A space which by design has limited openings for entry and exit, unfavorable natural ventilation which could contain or produce dangerous air contaminants, and which is not intended for continuous employee occupancy. Confined spaces include, but are not limited to storage tanks, process vessels, pits, silos, vats, degreasers, reaction vessels, boilers, ventilation and exhaust ducts, sewers, tunnels, underground utility vaults, and pipelines.
- D. High Visibility Accident: Any mishap which may generate publicity and/or high visibility.
- E. Medical Treatment; Medical treatment includes 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.
- F. Operating Envelope: The area surrounding any crane. Inside this "envelope" is the crane, the operator, riggers and crane walkers, rigging gear between the hook and the load, the load and the crane's supporting structure (ground, rail, etc.).
- G. Qualified Person for Fall Protection: A person with a recognized degree or professional certificate and with extensive knowledge, training and experience in the field of fall protection; who is capable of performing design, analysis, and evaluation of fall protection systems and equipment.
- H. Recordable Injuries or Illnesses: Any work-related injury or illness that results in:
 - 1. Death, regardless of the time between the injury and death, or the length of the illness;
 - 2. Days away from work (any time lost after day of injury/illness onset);
 - 3. Restricted work;

4. Transfer to another job;
 5. Medical treatment beyond first aid;
 6. Loss of consciousness; or
 7. A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (1) through (6) above.
- I. Weight Handling Equipment (WHE) Accident: A WHE accident occurs when any one or more of the six elements in the operating envelope fails to perform correctly during operation, including operation during maintenance or testing resulting in personnel injury or death; material or equipment damage; dropped load; derailment; two-blocking; overload; and/or collision, including unplanned contact between the load, crane, and/or other objects. A dropped load, derailment, two-blocking, overload and collision are considered an accident even though no material damage or injury occurs. A component failure (e.g., motor burnout, gear tooth failure, bearing failure) is not considered an accident solely due to material or equipment damage unless the component failure results in damage to other components (e.g., dropped boom, dropped load, roll over, etc.).]
- 1.5 REGULATORY REQUIREMENTS
- A. In addition to the detailed requirements included in the provisions of this Section see, Division 01, Section 01 42 20 "Reference Standards and Definitions" for other state laws, 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, regulations, and referenced documents vary, the most stringent requirements govern.
- 1.6 SITE QUALIFICATIONS, DUTIES, AND MEETINGS
- A. Personnel Qualifications:
- B. Site Safety and Health Officer (SSHO):
1. Provide a Site Safety and Health Officer (SSHO) at the work site at all times to perform safety and occupational health management, surveillance, inspections, and safety enforcement for the Contractor. The Contractor Quality Control (QC) person can be the SSHO on this project. Meet the following requirements within the SSHO:

Level 3: Unless additional requirements are necessitated by the nature of the work or skills of assigned personnel, provide an SSHO with a minimum of five (5) years safety work on similar projects. 30-hour OSHA construction safety class or equivalent within the last five (5) years. An average of at least 24 hours of formal safety training each year for the past 5 years. Competent person training as needed.
- C. Certified Safety Professional (CSP) and/or Certified Industrial hygienist (CIH):
Provide a Certified Safety Professional (CSP) and or Certified Industrial Hygienist (CIH) at the work site to perform safety and occupational health management, surveillance, inspections, and safety enforcement for the Contractor. The CSP and or CIH shall be the safety and occupational health "competent person" as defined by this section.
- D. Associate Safety professional (ASP), Certified Safety Trained Supervisor (STS) and/or Construction Health and Safety Technician (CHST):
Provide a/an Associate Safety Professional (ASP), Certified Safety Trained Supervisor (STS) and/or Construction Health & Safety Technician (CHST) at the work site to perform safety management, surveillance, inspections, and safety enforcement for the Contractor. The ASP, STS and/or CHST shall be the safety and occupational health "competent person" as defined by this section. The ASP, STS and/or CHST shall be at the work site at all times whenever work or testing is being performed and shall conduct and document daily safety inspections. The ASP, STS and/or CHST shall have no other duties other than safety and occupational health management, inspections, and enforcement on this contract.
- E. Crane Operators:
Meet the Crane Operators and Crane Operation requirements of the Connecticut Bureau of License and Permits – Cranes, Department of Administrative Services, Office of State Fire Marshal pursuant to C.G.S § 29-221 through 29-230. Provide proof of current license and qualification. For more information visit the DAS website (www.ct.gov/DAS) > Licensing, Certification, Permitting and Codes > Cranes, or call (860) 713-5580 or (860) 713-5529.
- F. Personnel Duties:

1. Site Safety and Health Officer (SSHO):
 - a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Attach safety inspection logs to the Contractors' daily quality control report.
 - b. Conduct mishap investigations and complete required reports. Maintain the OSHA Form 300 and Daily Production reports for prime and sub-contractors. For more information visit the OSHA website at www.osha.gov > Employers > Recordkeeping Requirements and Forms.
 - c. Maintain applicable safety reference material on the job site.
 - d. Attend the pre-construction conference, pre-work meetings including preparatory inspection meeting, and periodic in-progress meetings.
 - e. Implement and enforce accepted APPS and AHAs.
 - f. Maintain a safety and health deficiency tracking system that monitors outstanding deficiencies until resolution. Post a list of unresolved safety and health deficiencies on the safety bulletin board.
 - g. Ensure sub-contractor compliance with safety and health requirements.

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

- [2. Safety Personnel:
 - a. Perform safety and occupational health management, surveillance, inspections, and safety enforcement for the project.
 - b. Perform as the safety and occupational health "competent person" as defined by this section.
 - c. Be on-site at least weekly, and as often as required for safety of persons on site, whenever work or testing is being performed.
 - d. Conduct and document safety inspections.
 - e. Shall have no other duties other than safety and occupational health management, inspections, and enforcement on this contract.

All duties of the SSHO all duties of that position shall also be performed.

- G. Meetings:
 1. Preconstruction Conference:
 - a. Contractor representatives who have a responsibility or significant role in accident prevention on the project shall attend the preconstruction conference. This includes the project superintendent, site safety and health officer, quality control supervisor, or any other assigned safety and health professionals who participated in the development of the Accident Prevention Plan (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 Owner's Representative(s) as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, review, and acceptance of AHAs to preclude project delays.
 - c. Deficiencies in the submitted APP will be brought to the attention of the Contractor at the preconstruction conference, and the Contractor shall revise the plan to correct deficiencies and re-submit it for acceptance. Do not begin work until there is an accepted APP.
 2. Safety Meetings:

Safety meetings shall be conducted 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 health training and motivation.

 - a. Meetings shall be conducted at least once a month for all supervisors on the project location and at least once a week for all workers by supervisors or foremen.
 - b. Meetings shall be documented, including the date, persons in attendance, subjects discussed, and names of individual(s) who conducted the meeting. Documentation shall be maintained and copies furnished to the Construction Administrator (CA) on request.
 - c. The Construction Administrator (CA) shall be informed of all scheduled meetings in advance and be invited to attend.

1.7 ACCIDENT PREVENTION PLAN (APP):

- A. Use a qualified person to prepare the written site-specific APP.
1. Prepare the APP in accordance with the format and requirements of US Army Corps of Engineers (USACE), Safety, and Health Requirements Manual, EM 385-1-1, or as approved by the CA and as supplemented herein. Cover all paragraphs and subparagraph elements in USACE EM 385-1-1, Appendix A, "Minimum Basic Outline for Accident Prevention Plan" or as approved by the CA. The USACE Safety, and Health Requirements Manual, EM 385-1-1 is available at the USACE Website www.iwr.usace.army.mil.
 2. Specific requirements for some of the APP elements are described in "B" below. The APP shall be job-specific and address any unusual or unique aspects of the project or activity for which it is written.
- B. The APP shall interface with the Contractor's overall safety and health program. Include any portions of the Contractor's overall safety and health program referenced in the APP in the applicable APP element and made site-specific. The Owner considers the Prime General Contractor to be the "controlling authority" for all work site safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out. The APP shall be signed by the person and firm (senior person) preparing the APP, the Contractor, the on-site superintendent, the designated site safety and health officer and any designated Certified Safety Professional (CSP) and/or Certified Industrial Hygienist (CIH).
- C. Submit the APP to the DAS/CS Project Manager and Construction Administrator Fourteen (14) Calendar Days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP. Once accepted by the DAS/CS Project Manager and Construction Administrator, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP will be cause for stopping of work, at the discretion of the DAS/CS Project Manager and Construction Administrator, until the matter has been rectified. Once work begins, changes to the accepted APP shall be made with the knowledge and concurrence of the DAS/CS Project Manager and Construction Administrator, project superintendent, Site Safety and Health Officer (SSHO) and quality control manager. Should any hazard become evident, stop work in the area, secure the area, and develop a plan to remove the hazard. Notify the DAS/CS Project Manager and Construction Administrator within Twenty (24) hours of discovery. Eliminate/remove the hazard. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by American Society of Safety Engineers, ASSE/SAFE A10.34 - Protection of the Public on or Adjacent to Construction Sites, see www.asse.org) and the environment.

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

- D. APP Contents:
The contents of the Accident Prevention Plan (APP) shall be in accordance with Appendix A of the US Army Corps of Engineers, EM 385-1-1 Safety and Health Requirements Manual, Appendix A, Minimum Basic Outline for Accident Prevention Plans or as approved by the CA. For more information visit the USACE Website at www.usace.army.mil/Library.

1.8 ACTIVITY HAZARD ANALYSIS (AHA): Activity Hazard Analyses (AHAs) define the activities being performed and identify the sequences of work, the specific hazards anticipated, site conditions, equipment, materials, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level of risk. The Activity Hazard Analysis (AHA) format shall be in accordance with US Army Corps of Engineers, EM 385-1-1 Safety and Health Requirements Manual or as approved by the CA.

- A. Submittals:
1. Submit initial AHA to CA for review at least 15 Calendar Days prior to the start of each phase. Format subsequent AHAs as amendments to the APP. The analysis should be used during daily inspections to ensure the implementation and effectiveness of the activity's safety and health controls.
 2. The AHA list will be reviewed monthly at the Contractor supervisory safety meeting and updated as necessary when procedures, scheduling, or hazards change. Develop the activity hazard analyses using the project schedule as the basis for the activities performed. Any activities listed on the project

schedule will require an AHA. The AHAs will be developed by the contractor, supplier or subcontractor and provided to the prime contractor for submittal to the CA.

1.9 DISPLAY OF SAFETY INFORMATION

Within 1 Calendar Days after commencement of work, erect a safety bulletin board at the job site. Include and maintain information on safety bulletin board as required by US Army Corps of Engineers, EM 385-1-1 Safety and Health Requirements Manual, Section 01.A.06 or as approved by the CA. Additional items required to be posted include:

- A. Confined space entry permit.
- B. Hot work permit.

1.10 SITE SAFETY REFERENCE MATERIALS

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

1.11 EMERGENCY MEDICAL TREATMENT

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

1.12 REPORTS

A. Accident Reports

- 1. Conduct an accident investigation for recordable injuries and illnesses, and property damage accidents resulting in at least Two Thousand Dollars (\$2,000)in damages, to establish the root cause(s) of the accident, complete "Accident Report Form" approved by the CA. Provide the report to the CA within 5 Calendar Days of the accident.

B. Accident Notification

Notify the CA as soon as practical, but not later than four hours, after any accident meeting the definition of Recordable Injuries or Illnesses or High Visibility Accidents, property damage equal to or greater than \$2,000, or any weight handling equipment accident.

1. Within notification include the following:

- a. contractor name;
- b. contract title;
- c. type of contract;
- d. name of activity,
- e. installation or location where accident occurred;
- f. date and time of accident;
- g. names of personnel injured;
- h. extent of property damage, if any; extent of injury, if known, and brief description of accident to include type of construction equipment used, Personal Protective Equipment (PPE) used, etc.. Preserve the conditions and evidence on the accident site until the U.S. Department of Labor, Occupational Safety and Health Administration (USDOL-OSHA) investigation team arrives on-site and USDOL-OSHA investigation is conducted.

C. Monthly Exposure Reports

Monthly exposure reporting to the CA is required to be attached to the monthly Application for Payment request. This report is a compilation of employee-hours worked each month for all site workers, both prime and subcontractor. Provide on a form approved by the CA.

D. Crane Reports

Submit crane inspection reports on a form approved by the CA and as specified herein with Daily Reports of Inspections.

E. HOT WORK

Hot Work shall only be performed in accordance with the requirements of NFPA 51B "Fire Prevention During Welding, Cutting and Other Hot Work Standard.

1. Definitions:

- a. Hot Work: Work involving burning, welding, or a similar operation that is capable of initiating fires or explosions. Examples listed by NFPA include arc welding, oxygen- fuel gas welding, open-flame soldering, brazing, thermal spraying, oxygen cutting, and arc cutting.

- b. Permit Authorizing Individual (PAI). Means the individual designated by the General Contractor to authorize hot work. The PAI is permitted to be, among others, the General Contractor's project executive, supervisor, foreperson, or designated safety administrator. The PAI CANNOT be the hot work operator, except as permitted in NFPA 51B. The PAI is aware of the fire hazards involved and is familiar with the provisions of this standard.
- 2. Permit: Submit and obtain a written permit from the PAI prior to performing "Hot Work" (welding, cutting, etc.) or operating other flame-producing/spark producing devices, from the PAI. CONTRACTORS ARE REQUIRED TO MEET ALL CRITERIA BEFORE A PERMIT IS ISSUED. The General Contractor will provide at least two (2) twenty (20) pound 4A:20 BC rated extinguishers for normal "Hot Work". All extinguishers shall be current inspection tagged, approved safety pin and tamper resistant seal.
- 3. Fire Watch: It is also mandatory to have a designated FIRE WATCH for any "Hot Work" done at this activity. The Fire Watch shall be trained in accordance with NFPA 51B Standard for Fire Prevention During Welding, Cutting, and Other Hot Work and remain on-site for a minimum of 30 minutes after completion of the task or as specified on the hot work permit. When starting work in the facility, require personnel to familiarize themselves with the location of the nearest fire alarm boxes and place in memory the local fire department emergency phone number(s). ANY FIRE, NO MATTER HOW SMALL, SHALL BE REPORTED TO THE LOCAL FIRE DEPARTMENT, GENERAL CONTRACTOR'S AUTHORIZED REPRESENTATIVE, AND OWNER'S CA IMMEDIATELY.

1.13 FACILITY OCCUPANCY CLOSURE

Streets, walks, and other facilities occupied and used by the state User Agency shall not be closed or obstructed without written permission from the CA.

1.18 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/OR OTHER WORK

Comply with the Connecticut State Building and Fire Safety Codes, OSHA regulations, and other references regulations. The most stringent standard prevails.

3.1.2 HAZARDOUS MATERIAL EXCLUSIONS

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

3.2 PRE-OUTAGE COORDINATION MEETING

Contractors are required to apply for utility outages at least 15 Calendar Days in advance. As a minimum, the request should include the location of the outage, utilities being affected, duration of outage and any necessary sketches. Special requirements for electrical outage requests are contained elsewhere in this specification section. Once approved, and prior to beginning work on the utility system requiring shut down, attend a pre-outage coordination meeting with the CA, User Agency Representative, and Public Utilities representative to review the scope of work and the lock-out/tag-out procedures for worker protection. No work will be performed on energized electrical circuits unless proof is provided that no other means exist.

3.3 SAFETY LOCKOUT/TAGOUT PROCEDURES

- A. The General Contractor shall ensure that each employee is familiar with and complies with these procedures and OSHA 29 CFR 1910.147 Control Of Hazardous Energy (Lockout/Tagout).
1. The General Contractor's "Authorized Employee" shall apply lockout/tagout tags and take other actions that, because of experience and knowledge, are known to be necessary to make the particular equipment safe to work on.
 2. No person, regardless of position or authority, shall operate any switch, valve, or equipment that has an official lockout/tagout tag attached to it, nor shall such tag be removed except as provided in this section.
 3. No person shall work on any equipment that requires a lockout/tagout tag unless he, his immediate supervisor, project leader, or a subordinate has in his possession the stubs of the required lockout/tagout tags. Only qualified personnel shall perform work on electrical circuits.
 4. A supervisor who is required to enter an area protected by a lockout/tagout tag will be considered a member of the protected group provided he notifies the holder of the tag stub each time he enters and departs from the protected area.
 5. Identification markings on building light and power distribution circuits shall not be relied on for established safe work conditions.
 6. Before clearance will be given on any equipment other than electrical (generally referred to as mechanical apparatus), the apparatus, valves, or systems shall be secured in a passive condition with the appropriate vents, pins, and locks. Pressurized or vacuum systems shall be vented to relieve differential pressure completely. Vent valves shall be tagged open during the course of the work. Where dangerous gas or fluid systems are involved, or in areas where the environment may be oxygen deficient, system or areas shall be purged, ventilated, or otherwise made safe prior to entry.
- B. Tag Placement
Lockout/tagout tags shall be completed in accordance with the regulations printed on the back thereof and attached to any device which, if operated, could cause an unsafe condition to exist. If more than one group is to work on any circuit or equipment, the employee in charge of each group shall have a separate set of lockout/tagout tags completed and properly attached. When it is required that certain equipment be tagged, the State of Connecticut Authority Having Jurisdiction will review the characteristics of the various systems involved that affect the safety of the operations and the work to be done; take the necessary actions, including voltage and pressure checks, grounding, and venting, to make the system and equipment safe to work on; and apply such lockout/tagout tags to those switches, valves, vents, or other mechanical devices needed to preserve the safety provided. This operation is referred to as "Providing Safety Clearance."
- C. Tag Removal
When any individual or group has completed its part of the work and is clear of the circuits or equipment, the supervisor, project leader, or individual for whom the equipment was tagged shall turn in his signed lockout/tagout tag stub to the Contractor. That group's or individual's lockout/tagout tags on equipment may then be removed on authorization by the Contractor.

3.4 FALL HAZARD PROTECTION AND PREVENTION PROGRAM

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

- A. Training
Institute a fall protection training program. As part of the Fall Hazard Protection and Prevention Program, provide training for each employee who might be exposed to fall hazards. Provide training by a competent person for fall protection in accordance with USACE EM 385-1-1, Section 21.A.16.
- B. Fall Protection Equipment and Systems
Enforce use of the fall protection equipment and systems designated for each specific work activity in the Fall Protection and Prevention Plan and/or AHA at all times when an employee is exposed to a fall hazard. Protect employees from fall hazards as specified in USACE EM 385-1-1, section 21. In addition to the required fall protection systems, safety skiff, personal floatation devices, life rings etc., are required when working above or next to water in accordance with USACE EM 385-1-1, paragraphs 05.H. and 05.I. Personal fall arrest systems are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall arrest systems are required when operating other equipment such as scissor lifts if the work platform is capable of being positioned outside the wheelbase. The need for tying-off in such equipment is to prevent ejection of the employee from the equipment during

raising, lowering, or travel. Fall protection must comply with OSHA 29 CFR 1926.500, Fall Protection, Subpart M, and ASSE/SAFE A10.32, Fall Protection.

1. **Personal Fall Arrest Equipment**
Personal fall arrest equipment, systems, subsystems, and components shall meet ASSE/SAFE Z359.1, Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components. Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest body support device. Body belts may only be used as a positioning device system (for uses such as steel reinforcing assembly and in addition to an approved fall arrest system). Harnesses shall have a fall arrest attachment affixed to the body support (usually a Dorsal D-ring) and specifically designated for attachment to the rest of the system. Only locking snap hooks and carabiners shall be used. Webbing, straps, and ropes shall be made of synthetic fiber. The maximum free fall distance when using fall arrest equipment shall not exceed 1.8 m 6 feet. The total fall distance and any swinging of the worker (pendulum-like motion) that can occur during a fall shall always be taken
2. **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:**
 - (i) For work within 6 feet (6 feet (1.8 m) of an edge, on low-slope roofs, Protect personnel from falling by use of personal fall arrest systems, guardrails, or safety nets.
 - (ii) For work greater than (6 feet (1.8 m) from an edge, erect and install warning lines in accordance with OSHA 29 CFR 1926.500, Fall Protection.
 - b. **Steep-Sloped Roofs:** Work on steep-sloped roofs requires a personal fall arrest system, guardrails with toe-boards, or safety nets. This requirement also includes residential or housing type construction.
3. **Existing Anchorage**
Certified (or re-certified) by a qualified person for fall protection existing anchorages, to be used for attachment of personal fall arrest equipment in accordance with ASSE/SAFE Z359.1, Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components. Existing horizontal lifeline anchorages must be certified (or re-certified) by a registered professional engineer with experience in designing horizontal lifeline systems.
4. **Horizontal Lifelines**
Design, install, certify and use under the supervision of a qualified person horizontal lifelines for fall protection as part of a complete fall arrest system which maintains a safety factor of 2 (OSHA 29 CFR 1926.500 Fall Protection).
5. **Guardrails and Safety Nets**
Design, install and use guardrails and safety nets in accordance with 29 CFR 1926, Safety and Health Regulations for Construction Subpart M.
6. **Rescue and Evacuation Procedures**
When personal fall arrest systems are used, the contractor must ensure that the mishap victim can self-rescue or can be rescued promptly should a fall occur. Prepare a Rescue and Evacuation Plan and include a detailed discussion of the following: methods of rescue; methods of self-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility. Include the Rescue and Evacuation Plan within the Activity Hazard Analysis (AHA) for the phase of work, in the Fall Protection and Prevention (FP&P) Plan, and the Accident Prevention Plan (APP).

3.5 SCAFFOLDING

- A. The Contractor shall provide all employees with a safe means of access to the work area on the scaffold in accordance with OSHA 29 CFR 1910.28 Safety Requirements For Scaffolding and as contained in this section.
 1. Climbing of any scaffold braces or supports not specifically designed for access is prohibited.
 2. Access scaffold platforms greater than 20 feet (6 m) maximum in height by use of a scaffold stair system.

3. Do not use vertical ladders commonly provided by scaffold system manufacturers for accessing scaffold platforms greater than 20 feet (6 m) maximum in height.
4. The use of an adequate gate is required.
5. Ensure that employees are qualified to perform scaffold erection and dismantling.
6. Do not use scaffold without the capability of supporting at least four times the maximum intended load or without appropriate fall protection as delineated in the accepted fall protection and prevention plan.
7. Stationary scaffolds must be attached to structural building components to safeguard against tipping forward or backward.
8. Give special care to ensure scaffold systems are not overloaded. Side brackets used to extend scaffold platforms on self-supported scaffold systems for the storage of material are prohibited.
9. The first tie-in shall be at the height equal to 4 times the width of the smallest dimension of the scaffold base. Place work platforms on mud sills. Scaffold or work platform erectors shall have fall protection during the erection and dismantling of scaffolding or work platforms that are more than six feet. Delineate fall protection requirements when working above six feet or above dangerous operations in the Fall Protection and Prevention (FP&P) Plan and Activity Hazard Analysis (AHA) for the phase of work.

- B. Stilts
The use of stilts for gaining additional height in construction, renovation, repair or maintenance work is PROHIBITED.

3.6 EQUIPMENT

- A. Material Handling Equipment
Material Handling Equipment shall be in accordance with OSHA 29 CFR 1910.178 Powered Industrial Trucks and as contained in this section.
1. Material handling equipment such as forklifts shall not be modified with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions.
 2. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions.
 3. Operators of forklifts or power industrial trucks shall be licensed in accordance with OSHA.
- B. Weight Handling Equipment
1. Equip cranes and derricks as specified in ASME B30.5 or ASME B30.22 or ASME B30.8 as applicable.
 2. Comply with the crane manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Perform erection under the supervision of a designated person (as defined in ASME B30.5). Perform all testing in accordance with the manufacturer's recommended procedures.
 3. Comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, and ASME B30.8 for floating cranes and floating derricks.
 4. Under no circumstance shall a Contractor make a lift at or above 90% of the cranes rated capacity in any configuration.
 5. When operating in the vicinity of overhead transmission lines, operators and riggers shall be alert to this special hazard and follow the requirements of ASME B30.5 or ASME B30.22 as applicable.

6. Do not crane suspended personnel work platforms (baskets) unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Do not lift personnel with a line hoist or friction crane.
7. Inspect, maintain, and recharge portable fire extinguishers as specified in NFPA 10, Standard for Portable Fire Extinguishers.
8. All employees must keep clear of loads about to be lifted and of suspended loads.
9. Use cribbing when performing lifts on outriggers.
10. The crane hook/block must be positioned directly over the load. Side loading of the crane is prohibited.
11. A physical barricade must be positioned to prevent personnel from entering the counterweight swing (tail swing) area of the crane.
12. Certification records which include the date of inspection, signature of the person performing the inspection, and the serial number or other identifier of the crane that was inspected shall always be available for review by CA.
13. Written reports listing the load test procedures used along with any repairs or alterations performed on the crane shall be available for review by CA.
14. Certify that all crane operators have been trained in proper use of all safety devices (e.g. anti-two block devices).

C. USE OF EXPLOSIVES

Explosives shall not be used or brought to the project site without prior written approval from the CA. Such approval shall not relieve the Contractor of responsibility for injury to persons or for damage to property due to blasting operations. Storage of explosives, when permitted on State property, shall be only where directed and in approved storage facilities. These facilities shall be kept locked at all times except for inspection, delivery, and withdrawal of explosives. Explosive work shall be performed in accordance with the requirements of C.G.S. § 29-343 through 29-355 and as required by the Office of State Fire Marshal, CT Department of Construction Services.

3.7 EXCAVATIONS

A. Perform soil classification by a competent person in accordance with 29 CFR 1926 Safety and Health Regulations for Construction.

1. Utility Locations
All underground utilities in the work area must be positively identified by and coordinated in accordance with Division 00, General Conditions, Article 18 Surveys, Permits, And Regulations. All underground utilities in the work area must be positively identified by a private utility locating service and coordinated with the public utility company. Any markings made during the utility investigation must be maintained by the General Contractor throughout the contract.
2. Utility Location Verification
The Contractor must physically verify underground utility locations by hand digging using wood or fiberglass handled tools when any adjacent construction work is expected to come within three feet of the underground system. Digging within Two (2) feet of a known utility must not be performed by means of mechanical equipment; hand digging shall be used. If construction is parallel to an existing utility expose the utility by hand digging every 100 feet if parallel within Five (5) feet of the excavation.
3. Shoring Systems
Trench and shoring systems must be identified in the accepted safety plan and AHA. Manufacture tabulated data and specifications or registered engineer tabulated data for shoring or benching systems shall be readily available on-site for review. Job-made shoring or shielding must have the registered professional engineer stamp, specifications, and tabulated data. Extreme care must be used when excavating near direct burial electric underground cables.
4. Trenching Machinery
Operate trenching machines with digging chain drives only when the spotters/laborers are in plain view of the operator. Provide operator and spotters/laborers training on the hazards of the

digging chain drives with emphasis on the distance that needs to be maintained when the digging chain is operating. Keep documentation of the training on file at the project site.

3.8 UTILITIES WITHIN CONCRETE SLABS

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

3.9 ELECTRICAL

A. Conduct of Electrical Work

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

B. Portable Extension Cords

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

3.10 WORK IN CONFINED SPACES

- A. Comply with the requirements in OSHA 29 CFR 1910.146 and OSHA 29 CFR 1926.21(b) (6). Any potential for a hazard in the confined space requires a permit system to be used.
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. All hazards pertaining to the space shall be reviewed with each employee during review of the AHA.
 2. 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.
 3. Sewer wet wells require continuous atmosphere monitoring with audible alarm for toxic gas detection.

END OF SECTION 01 35 26

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

- A. General: Basic contract definitions are included in the General Conditions of the Contract for Construction.
- B. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings, or other paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the reader locate the reference. Location is not limited to this term.
- C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Architect, requested by the Architect, and similar phrases.
- D. "Approved": The term "approved," when used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.
- E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": The term "furnish" means supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": The term "install" describes operations at the Project Site including the actual unloading, unpacking, assembly, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.
- I. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.
 - 1. The term "experienced," when used with the term "installer," means having a minimum of five (5) previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of authorities having jurisdiction.
 - 2. Trades: Using terms such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.
 - 3. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no option. However, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.
 - a. This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade-union jurisdictional settlements and similar conventions.
- J. "Project Site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction, with others performing other Work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.
- K. "Testing Agencies": A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

- A. Specification Format: These Specifications are organized into Divisions and Sections based on CSI's "MasterFormat" 49-Division format and numbering system.
- B. Specification Content: This Specification uses certain conventions regarding the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:
 - 1. Abbreviated Language: Language used in Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated, as the sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
 - 2. Streamlined Language: The Specifications generally use the imperative mood and streamlined language. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.
 - a. The words "shall be" are implied where a colon (:) is used within a sentence or phrase.

1.4 INDUSTRY STANDARDS

- A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents unless a specific date is indicated in the Contract Documents or the governing regulations cited herein.
- C. Conflicting Requirements: Where compliance with two (2) or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent and highest quality requirement. Request a decision from the Architect before proceeding on requirements that are different but apparently equal, and where it is uncertain which requirement is the most stringent.
 - 1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum acceptable. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Request a clarification from the Architect regarding uncertainties before proceeding.
- D. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source.
- E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-generating organization, authorities having jurisdiction, or other entity applicable to the context of the text provision. Refer to Thompson Gale's "Encyclopedia of Associations," available in most libraries.

1.5 GOVERNING REGULATIONS AND AUTHORITIES

- A. Copies of Regulations: Obtain copies of the "latest applicable State Codes" and the following regulations and retain at the Project Site to be available for reference by parties who have a reasonable need during submittals, planning, and progress of the Work, until Substantial Completion.
 - 1. Connecticut State Building Code - 2018
 - 1.2 CT Amendments - 2018
 - 1.3 International Building Code - 2015.
 - 1.5 International Mechanical Code - 2015
 - 1.6 International Plumbing Code - 2015
 - 1.7 International Energy Conservation Code - 2015
 - 1.8 National Electric Code (NFPA 70) - 2017

- 1.9 ICC/ANSI A117.1-Accessible and Usable Buildings and Facilities - 2009
- 2. Connecticut Fire Safety Code - 2018
 - 2.2 CT Amendments - 2018
 - 2.3 International Fire Safety Code - 2015.
 - 2.4 NFPA 101 - 2015
- 3. Connecticut Fire Prevention Code - 2018
 - 3.1 NFPA 1 - 2015
- 4. Occupational Safety and Health Administration (OSHA)
 - 4.1 OSHA 29 CFR Part 1910 Occupational Safety and Health Regulations
 - 4.2 OSHA 29 CFR Part 1926 Occupational Safety and Health Regulations for Construction
- B. The "latest applicable State Codes" are available for download from the DAS website (www.ct.gov/das) > Doing Business With The State > State Building Construction > Publications and Forms > Office of State Building Inspector *and* Office of State Fire Marshal. Also visit the www.ctdol.state.ct.us Connecticut Department of Labor website.

1.6 SUBMITTALS

- A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01 42 20

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for quality-control services.
- B. Quality-Control services include fire alarm acceptance testing, inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by the Owner.
- C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.
- D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.
 - 1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified inspections, tests, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- E. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section 01 33 00 "Submittal Procedures" specifies requirements for development of a schedule of required tests and inspections.
 - 2. Division 01 Section 01 73 29 "Cutting and Patching" specifies requirements for repair and restoration of construction disturbed by inspection and testing activities.
 - 3. Division 01 Section 01 77 00 "Closeout Procedures", specific requirements for contract closeout procedures.
 - 4. Division 28 Section 28 31 00 "Fire Detection and Alarm" specifies field quality control for the Alarm System.

1.3 RESPONSIBILITIES

- A. Contractor Responsibilities: Unless otherwise indicated as the responsibility of another identified entity, the Owner, through the Construction Administrator, shall provide inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction. All tests required by the individual specification sections are required to be scheduled and notification given to the Construction Administrator 24/48 hours in advance of the test/inspection as applicable. Costs for these services are not included in the Contract Sum.
 - 1. Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Contractor's responsibility, the Contractor shall employ and pay a qualified independent testing agency to perform quality-control services. Costs for these services are included in the Contract Sum.
 - 2. Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Owner's responsibility, the Owner will employ and pay a qualified independent testing agency to perform those services.
 - a) Such services include Special Inspections as required by the latest edition of the "Connecticut State Building Code".
 - b) Where the Owner has engaged a testing agency for testing and inspecting part of the Work, and the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the Owner. The Owner will engage the services of a qualified Special Inspector for this project. The Special Inspector, as a representative of the Owner, shall

- document and confirm compliance with the provisions of the Connecticut State Building Code for Special Inspections.
- c) Materials and assemblies for this project will be tested and construction operations inspected as the work progresses. Failure to detect any defective work or material shall not in any way prevent later rejection when such defect is discovered nor shall it obligate the State for final acceptance.
 - d) The Owner's use of testing and inspection services shall in no way relieve the Contractor of the responsibility to furnish materials and finished construction in full compliance with the Contract Documents and the Connecticut State Building Code.
- B. Retesting: The Contractor is responsible for retesting where results of inspections, tests, or other quality-control services prove unsatisfactory and indicate noncompliance with Contract Document requirements, regardless of whether the original test was Contractor's responsibility.
- 1. The cost of retesting construction, revised or replaced by the Contractor, is the Contractor's responsibility where required tests performed on original construction indicated non-compliance with Contract Document requirements.
 - 2. The Owner will issue a credit change order to cover all costs incurred related to all re-tests/re-inspections due to non-compliance to the Contract Documents, including but not limited to the Owner's costs and the Consultant's costs.
- C. Associated Services: Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the Agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:
- 1. *Provide access to the Work.*
 - 2. *Furnish incidental labor and facilities necessary to facilitate inspections and tests.*
 - 3. *Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.*
 - 4. *Provide facilities for storage and curing of test samples.*
 - 5. *Deliver samples to testing laboratories.*
 - 6. *Provide an approved design mix proposed for use for material mixes that require control by the testing agency.*
 - 7. *Provide security and protection of samples and test equipment at the Project Site.*
- D. Duties of the Testing Agency: The independent testing agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual Sections shall cooperate with the Construction Administrator, Architect and the Contractor in performance of the testing agency's duties. The testing agency shall provide qualified personnel to perform required inspections and tests.
- 1. The testing agency shall notify the Construction Administrator and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - 2. The testing agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.
 - 3. The testing agency shall not perform any duties of the Contractor.
- E. Owner will pay for the services of an independent testing agency laboratory to perform inspections, tests and other services required by the Specifications except as noted below, listed for which the Owner will issue a deduct change order to cover the cost associated with these tests:
- 1. When the Contractor notifies the Construction Administrator and/or Testing Agency less than 24 hours before the expected time of testing.
 - 2. When the Contractor requires testing for his own convenience.
 - 3. When the Contractor schedules a test and is not ready for the required test.
- F. Submit reports of tests that are part of the submittal requirements which indicate compliance or non-compliance with the specified standard.
- G. See also General Conditions Article 16 "Inspections & Tests".
- H. Fire Alarm/Acceptance Testing Procedures:

1. For *all* buildings (exceeding the threshold limit and not exceeding the threshold limit), the fire alarm testing shall be as the authority having jurisdiction shall dictate. This will be as determined by the Office of the State Fire Marshal (OSFM), and shall include, but not be limited to, the requirements as set below:
 - a. Protective Signaling Systems: All protective signaling systems shall meet with acceptance testing requirements of the applicable standards listed in Section 28 46 21, NFPA 101/2015 and NFPA 13/Latest Edition.
 - b. Prior Test Notification: At least five (5) working days prior to testing, the Fire Alarm Contractor shall notify (in writing) the following people of the proposed date the acceptance tests are to be performed (Also, see Part 2 of Certificate of Compliance).
 - Department of Administrative Services – OSFM Representative
 - General Contractor
 - Engineer of Record
 - Equipment Supplier Representative
 - Sprinkler Contractor
 - c. Certificates of Compliance:
 - 1) A Fire Alarm System Inspection and Testing Certification and Description form shall be prepared for each system (See NFPA 72/2016, Chapter 7).
 - 2) Parts 1 and 3 through 9, shall be completed after the system is installed and the installation of the wiring has been checked. Every alarm device must also be pre-tested to ensure proper operation and correct annunciation at each remote annunciator and control panel. Part 1 of the form (Certification of System Installation) shall be signed by the fire alarm contractor. The signed and completed preliminary copies of the Certification form shall be forwarded to all parties along with the Prior Test Notification.
 - 3) Part 2, of each applicable form, shall be completed after the operational tests have been completed.
 - 4) After the completion of the operational acceptance tests and sign-off of test witness (with stipulations noted), final copies of the Certificates shall be forwarded to the Department of Construction Services Representatives.
 - d. Tests:
 - 1) All tests shall be conducted in accordance with the Manufacturer's Testing Recommendations.
 - 2) All testing equipment, apparatus (i.e. sound level decibel meter, 2-way radio communication, test devices, ladders, tools, lighting, etc.) and personnel shall be supplied by the Fire Alarm Contractor and Sprinkler Contractor.
 - e. System Documentation: Every system shall include the following documentation, which shall be delivered to the Department of Construction Services Representatives upon final acceptance of the system. An owner's manual or manufacturer's installation instructions covering all system equipment, including the following:
 - 1) A detailed narrative description of the system inputs, evacuation signaling, ancillary functions, annunciation, intended sequence of operations, expansion capability, application considerations, and limitations.
 - 2) Operator's instructions for basic systems operations including alarm acknowledgment, system reset, interpreting system output (LED's CRT display, and printout), operation of manual evacuation signaling and ancillary function controls, changing printer paper, etc.
 - 3) A detailed description of routine maintenance and testing as required and recommended and as would be provided under a maintenance contract, including testing and maintenance instructions for each type of device installed. This information should include:
 - (a) A listing of individual system components that require periodic testing and maintenance.
 - (b) Step by step instructions detailing the requisite testing and maintenance procedures and the intervals at which those procedures should be performed.

- (c) A schedule that correlates the testing and maintenance procedures required by paragraph (2) above and with the listing required by paragraph (1) above.
- 4) Detailed troubleshooting instructions for each type of trouble condition recognized by the system, including opens, grounds, parity errors, "loop failures," etc. These instructions should include a list of all trouble signals, and step by step instructions describing how to isolate those problems and correct them (or call for service as appropriate).
- 5) A service directory, including a list of names and telephone numbers for those who should be called to service the system.
- f. As-Built Drawings:
 - 1) The Contractor will produce two (2) sets of as-built drawings and specifications for the fire alarm system, indicating the location (and programmed address, if applicable) of all devices and appliances, the wiring sequences, wiring methods, connection of the components, and sequence of operation of the protective signaling system as installed, 2016 shall be given to the Department of Construction Services representatives. This shall be in Accordance with NFPA 72/2016. Refer also to Section 01 77 00 "Closeout Procedures".

1.4 SUBMITTALS

- A. Unless the Contractor is responsible for this service, the independent testing agency shall submit a certified written report, in duplicate, of each inspection, test, or similar service to the Construction Administrator. If the Contractor is responsible for the service, submit a certified written report, in duplicate, of each inspection, test, or similar service through the Contractor.
 - 1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
 - 2. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:
 - a. Date of issue.
 - b. Project title and number.
 - c. Name, address, and telephone number of testing agency.
 - d. Dates and locations of samples and tests or inspections.
 - e. Names of individuals making the inspection or test.
 - f. Designation of the Work and test method.
 - g. Identification of product and Specification Section.
 - h. Complete inspection or test data.
 - i. Test results and an interpretation of test results.
 - j. Ambient conditions at the time of sample taking and testing.
 - k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
 - l. Name and signature of laboratory inspector.
 - m. Recommendations on re-testing.

1.5 QUALITY ASSURANCE

- A. Qualifications for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, that are pre-qualified as complying with the National Voluntary Laboratory Accreditation Program and that specialize in the types of inspections and tests to be performed.
 - 1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the state where the Project is located.
- B. Mockups: Provide full-size, physical assemblies that are constructed on-site. Mockups will be used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not samples. Approved mockups establish the standard by which the Work will be judged.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 MOCKUPS

- A. Build site-assembled mockups using installers who will perform same tasks for project.
- B. Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 - 2. Notify Architect seven (7) days in advance of dates and times when mockups will be constructed.
 - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 - 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 6. Demolish and remove mockups when directed, unless otherwise indicated.

3.2 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Comply with Contract Document requirements for Division 01 Section 01 73 29 "Cutting and Patching."
- B. Protect constructions exposed by or for quality-control service activities, and protect repaired construction.
- C. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

END OF SECTION 01 45 00

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to this section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Requirements of baseline Indoor Air Quality (IAQ) testing for maximum indoor pollutant concentrations for acceptance of the facility.
 - 2. Requirements for independent materials testing of specific materials anticipated to have major impact on IAQ.
 - 3. Procedures for testing specific construction materials for IAQ performance to assure compliance with green building rating system credits. Materials have been identified for independent testing based on the following three (3) criteria:
 - a. Large volume of material used in occupied spaces.
 - b. The space is occupied during normal working hours.
 - c. Materials are used in an area where there is recirculating air.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Divisions 01 through 49 sections for green building rating system requirements specific to the Work of each of those sections. These requirements may or may not include reference to LEED or Green Globes.
 - 2. Division 23 Section 23 05 93 "Testing, Adjusting and Balancing for HVAC" for additional requirements for baseline testing for IAQ.
 - 3. Division 23 Section 23 05 93 "Testing, Adjusting and Balancing for HVAC" for cleaning of HVAC system including duct work, air intakes and returns, and changing of filters.

1.3 REFERENCES

- A. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE):
 - 1. ASHRAE 52.2-1999, Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.
- B. ASTM International, Inc. (ASTM):
 - 1. ASTM D5116-2006, Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.
- C. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA):
 - 1. IAQ Guidelines for Occupied Buildings Under Construction, 1995.
- D. United States Environmental Protection Agency (EPA):
 - 1. Compendium of Methods for the Determination of Air Pollutants in Indoor Air.

1.4 SUBMITTALS

- A. Baseline IAQ Testing: Submit a report for each test site specified for IAQ baseline testing as prescribed in Section 23 05 93 "Testing, Adjusting and Balancing for HVAC". Report on air concentrations of targeted pollutants as identified in Table 3.1 below.
- B. Product Emissions Test Reports: Submit a report for each material emissions test performed. Report test results in terms of emission factors that will be used by the Owner to model indoor air concentrations. These reports and the modeling data prepared by the Owner shall be included in the closeout documentation specified in Section 01 77 00 "Closeout Procedures".
- C. Green Building Certification Documentation Submittals:
 - 1. Construction Indoor Air Quality (IAQ) Management Plan (During Construction) Credit:
 - a. Construction IAQ management plan.
 - b. Letter confirming if the permanently installed air handling equipment was used during construction.

- c. Product data for temporary filtration media. Indicate manufacturer, model number, MERV rating, and location of installed media.
 - d. Letter confirming that each filtration media was replaced prior to final occupancy.
 - e. Product data for filtration media to be used during occupancy. Indicate manufacturer, model number, MERV rating, and location of media.
 - f. Construction Documentation: Six (6) photographs at three (3) different occasions during construction along with a brief description of the SMACNA approach employed, document implementation of the IAQ management measures, such as protection of ducts and on-site stored or installed absorptive materials.
2. Construction Indoor Air Quality (IAQ) Management Plan (Before Occupancy) Credit:
- a. Signed letter confirming the approach taken by the project (pre-occupancy flush-out; flush-out with early occupancy flush-out or IAQ testing).
 - b. A narrative describing the building air flush-out procedures including the dates when flush-out was begun and completed and statement that filtration media was replaced after flush-out.
 - c. Product data for filtration media used during flush-out and during occupancy.
 - d. A narrative describing the building's IAQ testing process and results including the dates when testing was started and completed.
 - e. Report from testing and inspecting agency indicating results of IAQ testing and documentation showing conformance with IAQ testing procedures and requirements.

1.5 QUALITY ASSURANCE

- A. Perform material tests and report results in accordance with ASTM D5116.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 BASELINE IAQ TESTING

- A. HVAC System Verification: To assure compliance with recognized standards for indoor air quality including ASHRAE 62-2004, the Contractor's independent testing and balancing agency shall verify the performance of each HVAC system including space temperature and space humidity uniformity, outside air quantity, filter installation, drain pan operation, and any obvious contamination sources.
- B. Indoor Air Quality Testing: Upon verification of HVAC system operation, the Contractor shall hire an independent contractor, subject to approval by the Architect, with a minimum of five (5) years experience in performing the types of testing specified herein, to test levels of indoor air contaminants for compliance with specified requirements.
 1. Submit a test plan for the approval of the Architect. The plan shall specify procedures, times, instrumentation, and sampling methods that will be employed.
 2. Perform testing in 12 different locations. Contaminant levels are to be measured on each floor of each building in an area agreed upon by the Contractor and the Architect. Areas with very high outside air ventilation rates such as laboratories are excluded from these testing requirements. The Architect is the sole judge of areas exempt from testing.
 3. Collect air samples on three (3) consecutive days during normal business hours (between the hours of 8:00 AM and 5:00 PM) with building operating at normal HVAC rates. Average the results of each three-day test cycle to determine compliance or non-compliance of indoor air quality for each air handling zone tested.
 4. Sample and record outside air levels of formaldehyde and TVOC contaminants at outside air intake of each respective air handling unit simultaneously with indoor tests to establish basis of comparison for these contaminant levels. Indoor testing will be done in the breathing zone; between four (4) and seven (7) feet from the floor.
 5. Acceptance of respective portions of buildings by the Architect is subject to compliance with specified limits of indoor air quality contaminant levels.

- C. Compliance indoor air quality shall conform to the following standards and limits:
1. Carbon Monoxide: Not to exceed nine (9) ppm.
 2. Carbon Dioxide: Not to exceed 800 ppm.
 3. Airborne Mold and Mildew: Simultaneous indoor and outdoor readings.
 4. Maximum Air Concentration Standards: Indoor room air concentration levels, emission rates, and qualities of the listed contaminants shall not exceed the following limits specified in Table 3.1 below.
- D. Test Reports: Prepare test reports showing the results and location of each test, a summary of the HVAC operating conditions, a listing of any discrepancies and recommendations for corrective actions, if required.
1. Include certification of test equipment calibration with each test report.
- E. If any test fails the standard, the Contractor is responsible to ventilate the building with 100 percent outside air until the building passes both air quality tests and duct inspections. Retesting shall be performed at no additional expense to the Owner.

Table 3.1 MAXIMUM INDOOR AIR CONCENTRATION STANDARDS

| INDOOR CONTAMINANTS | MAXIMUM AIR CONCENTRATION LEVELS* |
|---|--|
| Formaldehyde | 50 parts per billion |
| Particulates (PM10) | 50 micrograms per cubic meter |
| Total Volatile Organic Compounds (TVOC) | 500 micrograms per cubic meter |
| 4-Phenylcyclohexene (4-PCH)** | 6.5 micrograms per cubic meter |
| Carbon Monoxide (CO) | 9 parts per million and no greater than 2 parts per million above outdoor levels |

* All levels must be achieved prior to acceptance of the building. The levels do not account for contributions from office furniture, occupants, and occupant activities.

** This test is only required if carpet and fabrics with styrene-butadiene rubber (SBR) latex backing material are installed in the building.

- F. Construction Indoor Air Quality (IAQ) Management Plan (During Construction) Credit: Comply with SMACNA IAQ Guidelines for Occupied Buildings under Construction.
- G. Construction Indoor Air Quality (IAQ) Management Plan (Before Construction) Credit:
1. After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush-out by supplying a total air volume of 14000 cu ft of outdoor air per sq ft of floor area while maintaining an internal temperature of at least 60 degrees F and relative humidity no higher than 60 percent.
 2. If building occupancy is to occur before completion of the flush-out, deliver a minimum of 3500 cu ft of outdoor air per sq ft of floor area to the space. Once the space is occupied, ventilate it at a minimum rate of 0.30 cfm/sq ft of outside air or the design minimum outside air rate determined in accordance with Sections 4 through 7 of ASHRAE 62.1 or applicable local code, whichever is more stringent. During each day of the flush-out period, begin ventilation a minimum of three (3) hours prior to occupancy and continue during occupancy. Maintain these conditions until a total of 14000 cu ft/sq ft of outside air has been delivered to the space.
 3. Engage an independent testing and inspecting agency to conduct a baseline IAQ testing program according to EPA Compendium of Methods for the Determination of Air Pollutants in Indoor Air and the LEED for New Construction Version 4.1Guide.

3.2 INDEPENDENT MATERIALS TESTING

- A. Materials That Must Be Tested: Test materials listed below that are proposed for use on this project for permanent, in-place Indoor Air Quality performance in accordance with requirements of these specifications. Results shall be furnished to the Architect. Materials meeting the criteria for independent testing are as follows:
1. Field applied paint systems on appropriate substrate. Paint primers and intermediate coats (if used) should be applied with a typical drying time allowed between coats (not to exceed seven (7) days).
 2. Carpet including manufacturer's recommended adhesive. The carpet will be applied to the appropriate concrete flooring per manufacturer's instructions so that the testing is of the "carpet assembly."
 3. Acoustical ceiling tile.

4. Fireproofing material applied to appropriate substrate.
- B. Materials for Testing: Only test representative samples of actual products selected for use on this project. Tests of products generically and/or technically similar but produced by a manufacturer other than that of the product selected for use on this project is invalid.
- C. Materials Testing Parameters:
 1. Wrap each material to be tested in air tight covering for shipment direct from the factory to the testing laboratory to avoid contamination in transit. Unwrap material or apply material to substrate if material is wet-applied, such as paint or adhesive materials) in the testing lab.
 2. Emissions Testing: Perform all testing in accordance with ASTM D5116. Report results in accordance with Section ii of referenced ASTM Standard. Report in terms of emission rates at a minimum of three (3) distinct time intervals (e.g., one (1) hour, 24 hours, 72 hours) that will be modeled by the Architect to predict maximum indoor air concentrations and to assist the Contractor in determining suitability of products or materials. Assumptions that will be used for the Architect's model are given below for information.
 3. Table 3.2 summarizes required product testing.

Table 3.2 PRODUCT EMISSION TESTING

| PRODUCT ASSEMBLY TO BE TESTED | TVOC (per ASTM) | PM (per NIOSH) |
|--|-----------------|----------------|
| Wall paint on appropriate substrate, including any primer coat | Yes | No |
| Carpet including adhesive and concrete flooring | Yes | No |
| Acoustical Ceiling Tile | No | Yes |
| Fireproofing material on appropriate substrate | No | Yes |

- D. Model Assumptions Used for Predicting Indoor Air Concentrations: The model will assume the standard room enclosure as 10' long x 10' wide x 9' high. Each product tested will be modeled separately to provide information on the particular product. The model will assume a ventilation rate of one (1) air change per hour.
 1. Field Applied Paint Systems: Test fully cured samples of each complete paint system including primers, intermediate coats (if used), and finish coats. The model assumes application to all four (4) walls and one-half of ceiling of model standard room enclosure.
 2. Carpet and Adhesive Assembly: Assumes application to entire 10 x 10 ft floor surface of model standard room enclosure.
 3. Acoustical Ceiling Tile: Assumes application to entire 10 x 10 ft ceiling surface of model standard room enclosure.
 4. Fireproofing: Assumes application to entire 10 x 10 ft area above the ceiling surface of model standard room enclosure.
- E. Materials Test Reports: Submit test reports to the Architect. The report shall include the information outlined in Section 11 of ASTM D5116.
- F. Product/Material Evaluation: All products/materials shown by testing to comply with emissions limits and other criteria specified in this section will be approved for use on this project subject to compliance with all other specified requirements of the Project Manual. Products/materials shown by model to exceed specified emission limits shall be discussed, test results interpreted, and a determination made as to alternative product uses or selections.

END OF SECTION 01 45 23.13

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Division 00 General Conditions of the Contract for Construction for Design-Bid-Build and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes requirements for identification badges, parking stickers, construction facilities and temporary controls, including temporary utilities, support facilities, and security and protection.
- B. Temporary utilities include, but are not limited to, the following:
 - 1. Temporary water service and distribution.
 - 2. Temporary electric power and lighting services.
 - 3. Temporary heating, cooling and ventilation
 - 4. Temporary telephone service and data.
 - 5. Temporary sanitary facilities, including drinking water.
 - 6. Storm and sanitary sewer.
 - 7. Storm water pollution control.
- C. Support facilities include, but are not limited to, the following:
 - 1. Field offices – Contractor, Subcontractor, Owner, and Construction Administrator.
 - 2. Storage and fabrication sheds.
 - 3. Temporary roads and paving.
 - 4. Dewatering facilities and drains.
 - 5. Temporary enclosures.
 - 6. Temporary lifts, hoists and elevator use.
 - 7. Temporary project identification signs.
 - 8. Temporary exterior lighting.
 - 9. Collection and disposal of waste and cleaning.
 - 10. Temporary Environmental Controls.
 - 11. Stairs.
- D. Security and protection facilities include, but are not limited to, the following:
 - 1. Temporary fire protection.
 - 2. Permanent fire protection.
 - 3. Security for site and Agency.
 - 4. Barricades, warning signs, and lights.
 - 5. Enclosure fence.
 - 6. Security enclosure and lockup.
 - 7. Protection.
 - 8. Environmental protection.
 - 9. Traffic ways.
 - 10. Identification badges for Contractor's personnel & parking stickers.

1.3 RELATED SECTIONS

- A. Division 01 Section 01 57 30 "Indoor Environmental Control" for additional provisions governing temporary heating, ventilating and air conditioning.

1.4 SUBMITTALS

- A. Temporary Utilities: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.
- B. Implementation and Termination Schedule: Within twenty-one (21) days of the date established for commencement of the Work, submit a schedule indicating implementation and termination of each temporary utility.

1.5 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:
 - 1. Building and fire code requirements.
 - 2. Health and safety regulations.
 - 3. Utility company regulations.
 - 4. Police, fire department, and rescue squad rules.
 - 5. Environmental protection regulations.
 - 6. Americans with Disabilities Act.
- B. Standards: OSHA. Comply with NFPA 241 "Standard for Safeguarding Construction, Alteration, and Demolition Operations," ANSI A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA 200 "Recommended Practice for Installing and Maintaining Temporary Electric Power at Construction Sites."
 - 1. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70 "National Electric Code."
- C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

- A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, the Construction Administrator will direct the change over from use of temporary service to use of permanent service.
- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide new materials. If acceptable to the Architect, the Contractor may use undamaged, previously used materials in serviceable condition. Provide materials suitable for use intended.
- B. Lumber and Plywood: Comply with requirements in Division 06 Section 06 10 00 "Rough Carpentry."
 - 1. For signs and directory boards, provide 3/4-inch exterior grade, Grade A-B Fir plywood. Mount sign on preservative treated Fir posts.
 - a. Project sign shall be 4' x 8' painted and supported on 4-inch x 4-inch posts, of a design to be provided by the Owner via the Construction Administrator.
 - 2. Vision Barriers: Provide minimum 1/2-inch thick exterior plywood.
 - 3. For safety barriers, sidewalk bridges, and similar uses, provide minimum 5/8-inch thick exterior plywood.
- C. Paint: Comply with requirements of Division 09 Section 09 91 00 "Painting."

1. For sign and directory boards applying graphics, provide exterior-grade alkyd gloss enamel over exterior primer unless otherwise indicated.
- D. Tarpaulins: Provide waterproof, fire-resistant, UL-labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.
- E. Water: Provide potable water approved by local health authorities.
- F. Enclosure Fencing: Provide 0.120-inch thick, galvanized 2-inch chain link fabric fencing six (6) feet high galvanized steel pipe posts, 1-1/2 inches knuckle both bottom and top I.D. for line posts and 2-1/2 inches I.D. for corner posts.

2.2 EQUIPMENT

- A. General: Provide new equipment. If acceptable to the Architect, the Contractor may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.
 1. The Contractor shall furnish tools, apparatus and appliances, hoists and/or cranes and power for same, scaffolding, runways, ladders, temporary supports and bracing and similar work or material necessary to insure convenience and safety in the execution of the Contract except where this is otherwise specified in any Specification Section. All such items shall meet the approval of the Owner but responsibility for design, strength and safety shall remain with the Contractor. All such items shall comply with Federal OSHA regulations and applicable codes, statutes, rules and regulations, including compliance with the requirements of the current edition of the "Manual of Accident Prevention in Construction" published by the Associated Contractors (AGC) and the standards of the State Labor Department.
 2. Staging, exterior and interior, required for the execution of this Contract, shall be furnished, erected, relocated if necessary and removed by the Contractor. Staging shall be maintained in a safe condition without charge to and for the use of all trades as needed.
- B. Water Hoses: Provide 3/4-inch, heavy-duty, abrasion-resistant, flexible rubber hoses with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge and backflow preventers.
- C. Electrical Outlets: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-Volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment.
- D. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
- E. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures where exposed to breakage. Provide exterior fixtures where exposed to moisture.
- F. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM, or another recognized trade association related to the type of fuel being consumed.
- G. Temporary Field Offices: Provide prefabricated or mobile units with lockable entrances, operable windows, and serviceable finishes. Provide heated and air-conditioned units on foundations adequate for normal loading.
- H. Temporary Toilet Units: Provide self-contained, single-occupant toilet units of the chemical, aerated recirculation, or combustion type. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
- I. Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.
 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- C. Storm Water Pollution Control:
 - 1. The Architect/Engineer shall electronically register the Connecticut Department of Energy and Environmental Protection's (DEEP) "General Permit for the Discharge of Stormwater and Dewatering Wastewater from Construction Activities" (DEEP-WPED-GP-015) and Stormwater Pollution Control Plan (SPCP) through the DEEP ezFile Portal. The SPCP is attached to technical Section 31 20 05 "Sedimentation and Erosion Control".
 - 2. Once under contract, and prior to construction activities, the Contractor shall assume responsibility for storm water pollution control and conform to the General Permit obligations and requirements. The Contractor shall sign, and cause to be signed by each appropriate Subcontractor, the "Contractor Certification Statement" section of the SPCP and the DEEP "License Transfer Form" (DEEP-APP-006), as directed by the Architect/Engineer. The signed Certification Statement and License Transfer Form shall be attached to the "on-site" SPCP and submitted to the DEEP by the Architect/Engineer.
 - 3. The Owner shall be responsible for the General Permit registration fee and License Transfer notification fee.
 - 4. The Contractor shall retain an updated copy of the SPCP at the construction site from the date construction is initiated at the site until the date construction at the site is completed.
 - 5. The Contractor shall conform to the SPCP or use another plan, prepared at the Contractor's expense, which has been approved by the Owner and the DEEP *prior to construction activities*. The Contractor shall be responsible for implementing, maintaining, and updating the SPCP, including, but not limited to, performing regular inspections, conducting and reporting all stormwater monitoring activities, retaining records for the required period of time, and performing *all* post-construction measures and inspections.
 - 6. The Contractor shall ensure all post-construction measures are installed, cleaned, and functioning and the site has been stabilized for at least three (3) months following the cessation of construction activities in order for the project to be considered complete. A site is considered stabilized when there is no active erosion or sedimentation present and no disturbed areas remain exposed for all phases. Once the site has been stabilized for at least three (3) months, the Contractor shall have the site inspected by a Qualified Inspector to confirm final stabilization. If stabilized, the Contractor shall submit a Notice of Termination (DEP-PED-NOT-015) to the DEEP in order to terminate the Construction Stormwater General Permit.
 - 7. The Contractor shall submit a final copy of the SPCP, the Notice of Termination, and all inspection records to the Architect/Engineer and DAS/CS Project Manager at completion of all post-construction measures.
 - 8. The Contractor shall retain copies of the SPCP and all reports required by the General Permit, and records of all data used to complete the registration for the General Permit, for a period of at least five (5) years from the date that the project is complete. Inspection records must be retained as part of the SPCP for a period of five (5) years after the date of inspection.
 - 9. For sites involving total soil disturbance of less than one (1) acre, the Contractor shall be responsible for sediment and erosion control and utilize best management practices as identified in the "2002 Connecticut Guidelines for Soil Erosion and Sediment Control" (DEEP Bulletin 34), as amended, and any sediment and erosion control plans prepared for the project.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.
1. Arrange with company and existing users for a time when service can be interrupted, if necessary, to make connections for temporary services.
 2. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.
 3. Obtain easements to bring temporary utilities to the site where the Owner's easements cannot be used for that purpose.
 4. Use Charges: If cost or use charges for temporary facilities are specified by this section to be borne by the Owner the cost or use charges for temporary facilities will be borne not longer than thirty (30) days after final acceptance of the project.
- B. Temporary Water Service and Distribution:
1. Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.
 - a. Sterilization: Sterilize temporary water piping prior to use.
- C. Temporary Electric Power and Lighting Services:
1. Power and lighting may be taken from the power company's nearest pole with temporary poles, if needed, to extend the line to project. If permanent power lines have been installed before beginning project, then temporary lines can be brought in from the last pole.
 2. Provide service required for construction with branch wiring and distribution boxes located to provide power and lighting by construction-type extension cords. Meter shall be provided and installed by the Contractor.
 3. The Contractor shall pay all costs of temporary power and light.
 4. Temporary Lighting: When overhead floor or roof deck has been installed, provide temporary lighting with local switching. Install and operate temporary lighting that will fulfill security and protection requirements without operating the entire system. Provide temporary lighting that will provide adequate illumination for construction operations and traffic conditions.
- D. Temporary Heating, Cooling and Ventilating:
1. Provide temporary heat required by construction activities for curing or drying of completed installations or for protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy.
 - a. Heating Facilities: Except where the Owner authorizes use of the permanent system, provide vented, self-contained, LP-gas or fuel oil heaters with individual space thermostatic control.
 - b. Use of gasoline-burning space heaters, open flame, or salamander heating units is prohibited.
 2. Provide temporary heat during construction for interior areas included in the Contract to counteract low temperatures or excessive dampness. Maintain during said period or periods until final completion of the Contract, unless otherwise approved by the Owner in writing. Windows, doors, ventilators and similar openings shall be temporarily closed. Provide heat and ventilation to maintain specified conditions for construction operations and to protect materials and finishes from damage by temperature or humidity. The permanent heating system is not to be used for temporary heating unless approved, in writing, by the Owner. If approved, use of the permanent heating system by the Contractor does not constitute beneficial use by the Owner. The warranty for said system will not commence until Substantial Completion is granted. Costs shall be paid by the Contractor. See individual Sections for temperature/humidity limits. Temporary heating methods shall comply with OSHA regulations and other applicable codes, statutes, rules and regulations and shall be approved by the Architect/Engineer and Owner.
 3. Permanent air handling equipment, when used for temporary heating, shall be equipped with disposable "construction" filters. The construction filters shall have an average efficiency at least

equal to the filters specified under Division 23, but not less than 30 percent when tested in accordance with ASHRAE 52.2 "Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size." The filters shall have an average arrestance of not less than 90 percent efficiency on one (1) micron size particles. Before turning over the system for final acceptance, the contractor shall remove and dispose of the construction filters; clean the ductwork; spray clean the heating and cooling coils, and drain pans to "like new" condition; and install the filters specified in Division 23 Section 23 40 00 "HVAC Air Cleaning Devices."

4. Refer to Section 01 57 30 "Indoor Environmental Control" for additional requirements regarding means and methods of providing temporary heating, cooling and ventilating. Meet manufacturer's standards for minimum and maximum temperatures and humidity governing installation of materials and systems.
- E.** Temporary Telephone Service and Data: Provide temporary telephone service throughout the construction period for all personnel engaged in construction activities. Install telephone on a separate line for each temporary office and first aid station. Contractor shall provide telephone service in his office and separate telephone service in the DAS/CS Office and Construction Administrator's Office, if provided. It is preferred that the Contractor use a cellular phone. Basic service and local calls will be paid for by the Contractor. Toll calls will be paid for by the respective users.
1. Separate Telephone Lines: Provide additional telephone lines for the following:
 - a. Where an office has more than two (2) occupants, install a telephone for each additional occupant or pair of occupants.
 - b. Provide dedicated telephone lines for a separate fax machine in both the Contractor's office and the DAS/CS / CA office.
 2. At each telephone, post a list of important telephone numbers.
- F.** Temporary Sanitary Facilities, Including Drinking Water: Temporary sanitary facilities include temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for the type, number, location, operation, and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.
1. Provide toilet tissue, wash basins with water, soap and paper towels, paper cups, and similar disposable materials for each facility. Provide covered waste containers for used material. The Contractor shall maintain the facilities in a sanitary condition.
 2. Toilets: The Contractor shall install self-contained chemical toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted. Provide separate facilities for male and female personnel.
 3. Water Coolers: Where power is accessible, provide electric hot/cold water coolers to maintain dispensed cold water temperature at 45 to 55 degrees F. Provide bottled water service and cup supplies and maintain in a clean sanitary condition.
- G.** Storm and Sanitary Sewer: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully.
1. Filter out excessive amounts of soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
 2. Connect temporary sewers to the municipal system, as directed by sewer department officials.
 3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.
- H.** Storm Water Pollution Control: Provide storm water controls as indicated in the Contract Documents.

3.3 SUPPORT FACILITIES INSTALLATION

- A.** General: Locate field offices, storage sheds, and other temporary construction and support facilities in designated area as shown on the Contract Documents. The location of the trailers on the Drawings is diagrammatic in nature. Final placement of the trailers is to be approved by the Construction Administrator.
1. Maintain support facilities until Final Completion. Remove prior to Final Completion with permission from the Owner.

B. Field Offices: Provide insulated, weathertight temporary offices of sufficient size to accommodate required office personnel at the Project Site. Keep all offices clean and orderly, sweep weekly and remove rubbish on a daily basis. Furnish and equip offices as follows:

1. The Contractor shall provide an office for their own use and a method to contact them by e-mail and telephone at any point and time.
2. Owner and Construction Administrator's Field Offices / Equipment: The Contractor shall provide a field office for the Owner and Construction Administrator. The field office shall be *one (1) single wide trailer 12' x 60'*. The trailer shall have to be in "new condition" as determined by the Construction Administrator. *The trailer shall have a minimum of two (2) offices, each with a minimum of 150 square feet each, and a main meeting area.* The trailers shall have ample natural light, heating of sufficient capacity to maintain 70 degrees (F) in winter and air conditioning of sufficient capacity to maintain 75 degrees (F) in summer. The operational noise level of the supplied HVAC systems shall be low enough so as not to impede the conducting of meetings. The Contractor shall provide a 5-lb. ABC fire extinguisher and an OSHA- approved first aid kit. The Contractor shall provide the following furniture, and equipment which will remain his property. The furniture may be used but shall be in good condition as judged by the Owner and Construction Administrator.

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| 2.1 | The Contractor shall provide a lockable chemical toilet(s) with toilet tissue for the owners' use. The Contractor shall maintain the facility in a sanitary condition. (See Section 01 52 19 Temporary Sanitary Facilities). |
| 2.2 | Two (2) Lockable, double-pedestal, office desks, each with an executive chair. |
| 2.3 | Two (2) Plan tables. |
| 2.4 | Two (2) Plan racks. |
| 2.5 | Ten (10) Conference chairs and a conference table (approx. 5 feet x 12 feet). |
| 2.6 | Two (2) Side tables (approx. 3 feet x 5 feet). |
| 2.7 | Two (2) Wall mounted, cork display boards (4 foot x 6 foot). |
| 2.8 | Two (2) Wall mounted, white, wipe-off board, with markers (3 foot x 4 foot). |
| 2.9 | Four (4) File cabinets (lockable four drawer letter size). |
| 2.10 | Two (2) Bookshelves each with 10 linear feet x 12 inch wide shelving. |
| 2.11 | Two (2) Large capacity waste receptacles. |
| 2.12 | One (1) Plain paper, Fax Machine with dedicated telephone line approved by Owner. |
| 2.13 | Two (2) Telephones with telephone lines and voice mail. |
| 2.14 | Two (2) Telephones lines (dedicated to computer use) with high-speed Internet connection (minimum of DSL or cable modem service). |

C. Storage and Fabrication Sheds: Install storage and fabrication sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility service. Sheds may be open shelters or fully enclosed spaces within the building or elsewhere on-site.

1. Storage sheds for tools, materials and equipment shall be weathertight with heat, lighting and ventilation for products requiring controlled conditions.
2. Remove temporary materials, equipment services and construction before Substantial Completion.
3. Clean and repair damage caused by installation or use of temporary facilities. Restore existing facilities used during construction to specified or original condition.

D. Temporary Roads and Paving: Construct and maintain temporary roads and paving to support the indicated loading adequately and to withstand exposure to traffic during the construction period. Locate temporary paving for roads, storage areas, and parking where the same permanent facilities will be located. Review proposed modifications to permanent paving with the Construction Administrator and Architect.

1. Provide paving for pedestrian access and parking for field offices.
2. Paving: Comply with Division 32 Section 32 12 16 "Asphalt Paving" for construction and maintenance of temporary paving.
3. Coordinate temporary paving development with sub-grade grading, compaction, installation and stabilization of sub-base and installation of base and finish courses of permanent paving.

4. Install temporary paving to minimize the need to rework the installations and to result in permanent roads and paved areas without damage or deterioration when occupied by the Owner.
5. Extend temporary paving in and around the construction area as necessary to accommodate delivery and storage of materials, equipment usage, administration, and supervision.
- E. Dewatering Facilities and Drains: For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual Sections, comply with dewatering requirements of applicable Division 31 Sections. Where feasible, utilize the same facilities. Maintain the site, excavations, and construction free of water.
- F. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
 1. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
 2. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of 25-sq ft or less with plywood or similar materials.
 3. Close openings through floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
 4. Where temporary enclosure exceeds 100-sq ft in area, use UL-labeled, fire-retardant-treated material for framing and main sheathing.
- G. Temporary Lifts, Hoists and Elevator Use:
 1. Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
 2. Refer to Division 14 Sections for elevators.
- H. Temporary Project Identification Signs: Prepare project identification and other signs of size indicated. Install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative-treated wood or steel. Do not permit installation of unauthorized signs.
 1. Project Sign: Engage an experienced sign painter to apply graphics. Comply with details to be furnished by the Construction Administrator.
 - a. Temporary Tripod Frame: For groundbreaking ceremonies only, provide a temporary tripod for the sign illustrated and described below. Make the tripod of 12 ft long 2" x 4"s (Stud Grade), beveled and bolted at the top. Provide approximately 5-ft between legs at grade. Provide a 6-ft long, 2" x 4" seat for the sign; locate 5-ft above grade and nail in place. Nail sign at four (4) places where edges intersect tripod legs. Drive a 24" long, pointed 2" x 4" stake into the earth next to each leg and nail to legs.
 - b. Project Sign: The Contractor shall contact the Construction Administrator for the proper wording for the project sign. Fabricate sign of 3/4" Exterior Grade A-B Fir plywood. Mount sign on preservative treated Fir posts. The Owner shall provide design, color selection and illustration of the Project Sign. Paint both sides and all edges of sign and the posts with two (2) coats of exterior, white, alkyd primer. Paint the border and letters with "bulletin" (sign) paint. Letter sizes, colors and related information are given on the illustration below. A self-adhesive decal of the State seal will be furnished at the Contract signing. Erect the sign within two (2) weeks after execution of the Contract and remove the sign within one (1) week after completion of the project.
 - c. Project Sign Detail: Sign letter sizes, fonts, colors and related information are shown in the illustration available for download from the DAS website (www.ct.gov/das) > Doing Business With The State > State Building Construction > Publications and Forms > DAS Construction Services Library > 3000 Series - Design Phase Forms.
- I. Temporary Exterior Lighting: Install exterior yard and sign lights so signs are visible when Work is being performed.
- J. Collection and Disposal of Waste and Cleaning:
 1. Collect waste within the contract limit line from construction areas daily. Provide separate containers for proper waste recycling. Comply with requirements of NFPA 241 for removal of

combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than seven (7) days during normal weather or three (3) days when the temperature is expected to rise above 80 degrees F. Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.

2. Maintain areas under Contractor's control free of waste materials, debris and rubbish. Maintain in a clean and orderly condition.
3. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces and other closed or remote spaces before closing the space.
4. Periodically clean interior areas before start of surface finishing and continue cleaning on an as-needed basis.
5. Control cleaning operations so that dust and other particulates will not adhere to wet or newly coated surfaces.

K. Temporary Environmental Controls: Contractor is to provide the following controls.

1. Rodent and Pest Control: Before deep foundation work has been completed, retain a local exterminator or pest control company to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests. Employ this service to perform extermination and control procedures at regular intervals so the Project will be free of pests and their residues at materials.
2. Dust Control (construction and demolition).
3. Noise Control.
4. Erosion and Sediment Control.
5. Pollution Control.
6. Traffic Control.

L. Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate. Cover finished permanent stairs with a protective covering of plywood or similar material so finishes will be undamaged at the time of acceptance.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION (listed in Paragraph 1.2 D)

A. Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer, as requested by the Owner.

B. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations."

1. Provide and locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
2. Store combustible materials in containers in fire-safe locations.
3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires. Prohibit smoking in hazardous fire-exposure areas.
4. Provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
5. The Contractor, during construction, shall be responsible for loss or damage by fire to the work of the Contract until completion. Any fire used within the structure for working purposes shall be extinguished when not in use. Bitumen or tar shall be melted on the ground only. No flammable material shall be stored in the structure in excess of amounts allowed by the authorities. No gasoline shall be stored in or close to the building at any time. The Contractor shall assign a responsible employee to be in charge of fire protection measures.
6. If an EPDM or other single-ply roof is included in the work that requires cleaning of mating surfaces of laps with gasoline, limit amount of gasoline on roof to two (2) gallons which shall be in UL listed containers. Also provide one 30 B:C fire extinguisher within 75 feet of any point on the roof.

- C.** Permanent Fire Protection: At the earliest feasible date in each area of the Project, complete installation of the permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.
- D.** Security for Site and Agency:
1. Provide security program and facilities to protect work, existing facilities and the Owner and Agency's operations from unauthorized entry, vandalism and theft. Coordinate with the Owner's and Agency's security program.
 2. The Contractor shall be solely responsible for damage, loss or liability due to theft or vandalism.
- E.** Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting, including flashing red or amber lights.
1. Provide covered walkways as required by governing authorities for public rights-of-way and for public access to existing buildings.
 2. Provide temporary, insulated, weathertight closures at openings to the exterior to provide acceptable working conditions and protection for materials, to allow for temporary heating and to prevent entry of unauthorized persons. Provide doors with self-closing hardware and locks.
 3. Barriers and enclosures shall be in conformance with code requirements. Do not block egress from occupied buildings unless necessary to further the work of the Contract. In this case, secure the Owners approval of an alternate egress plan.
 4. See also General Conditions Article 19, "Protection of the Work, Persons and Property".
- F.** Enclosure Fences: Before excavation begins, install an enclosure fence with lockable entrance gates. Locate where indicated on the Construction Documents, or enclose the entire site or the portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering the site, except by the entrance gates.
1. Provide chain link construction fencing with posts set in a compacted mixture of gravel and earth. Use existing fence to the extent possible.
- G.** Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Provide keys to the Construction Administrator.
1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.
- H.** Protection:
1. Protect buildings, equipment, furnishings, grounds and plantings from damage. Any damage shall be repaired or otherwise made good at no expense to the Owner.
 2. Provide protective coverings and barricades to prevent damage. The Contractor shall be held responsible for, and must make good at his own expense, any water or other type of damage due to improper coverings. Protect the public and building personnel from injury.
 3. Provide temporary protection for installed products. Control traffic in immediate area to minimize damage.
 4. Provide protective coverings for walls, projections, jambs, sills and soffits of openings. Protect finished floors and stairs from traffic, movement of heavy objects and storage. Prohibit traffic and storage on waterproofed and roofed surfaces and on lawn and landscaped areas.
 5. Provide temporary partitions and ceilings to separate work areas from Agency-occupied areas to prevent penetration of dust and moisture into Agency-occupied areas and equipment. Erect framing and sheet materials with closed joints and sealed edges at intersections with existing surfaces.
 6. See also General Conditions Article 19, "Protection of the Work, Persons and Property".
- I.** Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result.

- J.** Traffic Ways:
1. The Contractor may use on-site paved roads and parking areas but shall not encumber same or their access. Public highways shall not be blocked by standing trucks, parked cars, material storage, construction operations or in any other manner.
 2. Public roads and existing paved roads, drives and parking areas on Owner's property shall be kept free from scrap or debris due to construction operations and any damage to their surface caused by the Contractor shall be repaired by him at his own expense.
 3. If the work of the Contract affects public use of any street, road, highway or thoroughfare, the Contractor shall confer with the police authority having jurisdiction to determine if and how many police are needed for public safety in addition to any barriers and signals that may be needed. The Contractor will be responsible for payment of any needed police services.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A.** Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B.** Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
 2. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C.** Termination and Removal: Unless the Architect/CA requests that it be maintained longer, remove each temporary facility when the need has ended, when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are the Contractor's property. The Owner reserves the right to take possession of project identification signs.
 2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where the area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil in the area. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at the temporary entrances, as required by the governing authority.
 3. At Substantial Completion, clean and renovate permanent facilities used during the construction period including, but not limited to, the following:
 - a. Replace air filters and clean inside of ductwork and housings.
 - b. Replace significantly worn parts and parts subject to unusual operating conditions.
 - c. Replace lamps burned out or noticeably dimmed by hours of use.

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SECTION 015639 - TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.
- B. Related Requirements:
 - 1. Section 015000 "Temporary Facilities and Controls" for temporary site fencing.
 - 2. Section 017419 "Construction and Demolition Waste Management and Disposal".
 - 3. Section 018113 "Sustainable Design Requirements".
 - 4. Section 311000 "Site Clearing".
 - 5. Section 312000 "Earth Moving".

1.3 DEFINITIONS

- A. Caliper: Diameter of a trunk measured by a diameter tape or the average of the smallest and largest diameters at a height 6 inches (150 mm) above the ground for trees up to and including 4-inch (100-mm) size at this height and as measured at a height of 12 inches (300 mm) above the ground for trees larger than 4-inch (100-mm) size.
- B. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.
- C. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction as indicated on Drawings and defined by a circle concentric with each tree with a radius 1.5 times the diameter of the drip line unless otherwise indicated.
- D. Vegetation and Soil Protection Zones: Area designated to be protected from all disturbances throughout the construction process to prevent damage to vegetation, soil structure and function.
- E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:
 - a. Tree-service firm's personnel, and equipment needed to make progress and avoid delays.
 - b. Arborist's responsibilities.
 - c. Quality-control program.
 - d. Coordination of Work and equipment movement with the locations of protection zones.
 - e. Trenching by hand or with air spade within protection zones.
 - f. Field quality control.

1.5 SUSTAINABLE DESIGN REQUIREMENTS

- A. Sustainable Design Requirements: The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.6 ACTION SUBMITTALS

- A. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- B. Product Data: For each type of product.
- C. Shop Drawings:
 1. Include plans, elevations, sections, and locations of protection-zone fencing and signage, showing relation of equipment-movement routes and material storage locations with protection zones.
 2. Detail fabrication and assembly of protection-zone fencing and signage.
 3. Indicate extent of trenching by hand or with air spade within protection zones.
- D. Samples: For each type of the following:
 1. Organic Mulch: 1-quart (1-L) volume of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.
 2. Protection-Zone Fencing: Assembled Samples of manufacturer's standard size made from full-size components.

- 3. Protection-Zone Signage: Full-size Samples of each size and text, ready for installation.

- E. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.
 - 1. Species and size of tree.
 - 2. Location on site plan. Include unique identifier for each.
 - 3. Reason for pruning.
 - 4. Description of pruning to be performed.
 - 5. Description of maintenance following pruning.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For arborist and tree service firm.

- B. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.

- C. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.

- D. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.
 - 1. Use sufficiently detailed photographs or video recordings.
 - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

- E. Quality-control program.

1.8 QUALITY ASSURANCE

- A. Arborist Qualifications: Certified Arborist as certified by ISA.

- B. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.

- C. Quality-Control Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work without damaging trees and plantings. Include dimensioned diagrams for placement of protection zone fencing and signage, the arborist's and tree-service firm's responsibilities, instructions given to workers on the use and care of protection zones, and enforcement of requirements for protection zones.

1.9 FIELD CONDITIONS

- A. The following practices are prohibited within protection zones:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Moving or parking vehicles or equipment.
 - 3. Foot traffic.
 - 4. Erection of sheds or structures.
 - 5. Impoundment of water.
 - 6. Excavation or other digging unless otherwise indicated.
 - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- B. Do not direct vehicle or equipment exhaust toward protection zones.
- C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 MATERIALS

- A. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:
 - 1. Type: Shredded hardwood.
 - 2. Size Range: 3 inches (76 mm) maximum, 1/2 inch (13 mm) minimum.
 - 3. Color: Natural.
- B. Protection-Zone Fencing: Fencing fixed in position and meeting one of the following requirements:
 - 1. Chain-Link Protection-Zone Fencing: Galvanized-steel fencing fabricated from minimum 2-inch (50-mm) opening, 0.148-inch- (3.76-mm-) diameter wire chain-link fabric; with pipe posts, minimum 2-3/8-inch- (60-mm-) OD line posts, and 2-7/8-inch- (73-mm-) OD corner and pull posts and 0.177-inch- (4.5-mm-) diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.
 - a. Height: 48 inches (1200 mm).

2. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch (50-mm) maximum opening in pattern and weighing a minimum of 0.4 lb/ft. (0.6 kg/m); remaining flexible from minus 60 to plus 200 deg F (minus 16 to plus 93 deg C); inert to most chemicals and acids; minimum tensile yield strength of 2000 psi (13.8 MPa) and ultimate tensile strength of 2680 psi (18.5 MPa); secured with plastic bands or galvanized-steel or stainless-steel wire ties; and supported by tubular or T-shape galvanized-steel posts spaced not more than 96 inches (2400 mm) apart.
 - a. Color: High-visibility orange, nonfading.
 3. Gates: Single- or Double- swing access gates matching material and appearance of fencing, to allow for maintenance activities within protection zones; leaf width 36 inches (914 mm) min.
- C. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes prepunched and reinforced; legibly printed with nonfading lettering and as follows:
1. Size: A minimum of 12 inches by 18 inches.
 2. Text: "STAY OUT TREE PROTECTION AREA"
 3. Lettering: 3-inch- (75-mm-) high minimum, white characters on red background.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- B. Prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

3.2 PREPARATION

- A. Locate and clearly identify trees, shrubs, and other vegetation to remain. Tie a 1-inch (25-mm) blue vinyl tape around each tree trunk at 54 inches (1372 mm) above the ground.
- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.
- C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated. Do not exceed indicated thickness of mulch.
 1. Apply 2-inch (50-mm) uniform thickness of organic mulch unless otherwise indicated. Do not place mulch within 6 inches (150 mm) of tree trunks.

3.3 PROTECTION ZONES

- A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people from easily entering protected areas except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.
 - 1. Chain-Link Fencing: Install to comply with ASTM F567 and with manufacturer's written instructions.
 - 2. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect.
 - 3. Access Gates: Install where indicated; adjust to operate smoothly, easily, and quietly; free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Architect. Install one sign spaced approximately every 20 feet (6 m) on protection-zone fencing, but no fewer than four signs with each facing a different direction.
- C. Maintain protection zones free of weeds and trash.
- D. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.
 - 1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
 - 2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.4 EXCAVATION

- A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 312000 "Earth Moving" unless otherwise indicated.
- B. Trenching within Protection Zones: Where utility trenches are required within protection zones, excavate under or around tree roots by hand or with air spade, or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots.

- C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches (75 mm) back from new construction and as required for root pruning.
- D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.5 ROOT PRUNING

- A. Prune tree roots that are affected by temporary and permanent construction. Prune roots as follows:
 - 1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
 - 2. Cut Ends: Do not paint cut root ends.
 - 3. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
 - 4. Cover exposed roots with burlap and water regularly.
 - 5. Backfill as soon as possible according to requirements in Section 312000 "Earth Moving."
- B. Root Pruning at Edge of Protection Zone: Prune tree roots 12 inches (300 mm) outside of the protection zone by cleanly cutting all roots to the depth of the required excavation.
- C. Root Pruning within Protection Zone: Clear and excavate by hand or with air spade to the depth of the required excavation to minimize damage to tree root systems. If excavating by hand, use narrow-tine spading forks to comb soil to expose roots. Cleanly cut roots as close to excavation as possible.

3.6 CROWN PRUNING

- A. Prune branches that are affected by temporary and permanent construction. Prune branches as directed by arborist.
 - 1. Prune to remove only injured, broken, dying, or dead branches unless otherwise indicated. Do not prune for shape unless otherwise indicated.
 - 2. Do not remove or reduce living branches to compensate for root loss caused by damaging or cutting root system.
 - 3. Pruning Standards: Prune trees according to ANSI A300 (Part 1).
- B. Unless otherwise directed by arborist and acceptable to Architect, do not cut tree leaders.

- C. Cut branches with sharp pruning instruments; do not break or chop.
- D. Do not paint or apply sealants to wounds.
- E. Provide subsequent maintenance pruning during Contract period as recommended by arborist.

3.7 REGRADING

- A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.
 - 1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.
- C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- D. Minor Fill within Protection Zone: Where existing grade is 2 inches (50 mm) or less below elevation of finish grade, fill with backfill soil. Place backfill soil in a single uncompacted layer and hand grade to required finish elevations.

3.8 FIELD QUALITY CONTROL

- A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.9 REPAIR AND REPLACEMENT

- A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or to be relocated that are damaged by construction operations, in a manner approved by Architect.
 - 1. Submit details of proposed pruning and repairs.
 - 2. Perform repairs of damaged trunks, branches, and roots within 24 hours according to arborist's written instructions.
 - 3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.
- B. Trees: Remove and replace trees indicated to remain that are more than 25 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.
 - 1. Small Trees: Provide new trees of same size and species as those being replaced for each tree that measures 6 inches (150 mm) or smaller in caliper size.

2. Large Trees: Provide a quantity of new tree(s) of 4-inch (100-mm) caliper size equal to the sum of the caliper size being replaced for each tree being replaced that measures more than 6 inches (150 mm) in caliper size.

a. Species: As selected by Architect.

3. Plant and maintain new trees as specified in Section 329300 "Plants."

C. Soil Aeration: Where directed by Architect, aerate surface soil compacted during construction. Aerate 10 feet (3 m) beyond drip line and no closer than 36 inches (900 mm) to tree trunk. Drill 2-inch- (50-mm-) diameter holes a minimum of 12 inches (300 mm) deep at 24 inches (600 mm) o.c. Backfill holes with an equal mix of augered soil and sand.

3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION 015639

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Documents and general provisions of the Contract, including General Conditions of the Contract for Construction and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Microbial and fungal contamination control.
 - 2. Indoor air quality and pollution control.
 - 3. Heating, ventilating, and air conditioning.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section 01 45 23.13 "Testing for Indoor Air Quality (IAQ), Baseline IAQ, & Materials" for building flush out requirements.
 - 2. Division 01 Section 01 57 40 "Construction IAQ Management Plan" for a description of the IAQ management plan.

1.3 REFERENCES

- 1. ASTM International (ASTM):
 - a. ASTM D5116-2006, Standard Guide for Small-Scale Environmental Chamber Determination of Organic Emissions From Indoor Materials/Products.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 MICROBIAL AND FUNGAL CONTAMINATION CONTROL

- A. Perform, schedule, and sequence Work as required to limit conditions supporting formations of microbes, molds, and fungi.
 - 1. Control water penetration, dampness, and humidity to prevent products not treated for exterior use from becoming soaked or damp.
 - 2. Enclose building prior to installing interior materials and finishes.
 - 3. Do not install interior products subject to moisture absorption until building is enclosed and wet work generating moisture and humidity is complete.
- B. When visible formations are observed and when formations cannot be completely removed by non-abrasive surface cleaning:
 - 1. Remove and replace materials identified as food sources for microbes, molds, and fungi.
 - 2. Correct conditions supporting microbial, mold, and fungal growth.
- C. Remove interior products and finishes, identified as food sources that have absorbed sufficient moisture to become damp whether or not microbial, mold, or fungal growth is observed. Include:
 - 1. Gypsum board cores.
 - 2. Organic materials composed of cellulose fiber or paper.
 - 3. Materials containing sucrose or other binders identified as supporting microbial growth.
- D. Remove fibrous insulation materials subject to retaining moisture such as duct liner, insulation, and other materials that are made wet or damp and cannot immediately be made dry.
- E. Repair or replace ductwork, pans, and other conditions subject to moisture condensation, water penetration, or other water source not drained and made dry.
 - 1. Remove conditions that have become an environment for microbes, molds, or fungi.

2. Do not permit conditions leading to standing water.
- F. Install wet work and allow time needed to dry and cure prior to installing materials such as carpet, acoustical material, textiles, and other material of type that may attract and retain moisture.

3.2 INDOOR AIR QUALITY AND POLLUTION CONTROL

- A. Product Emission Rate Standards: Test to ASTM D5116 for maximum indoor air concentration levels.
 1. Formaldehyde:
 - a. 0.03 parts per million where no other requirements are specified.
 - b. 0.005 parts per million where products are specified as formaldehyde free.
 2. Total VOC Emissions for Carpet Tile, Adhesives, and Sealers: 0.05 mg/m² per hour.
 3. 4 Phenyl Cyclohexene (4-PC) Particulate Emissions for Carpet: One (1) part per billion.
 4. Total Particulate Emission Rate Levels: 50 ug/m³.
 5. Primary and Secondary Regulated Pollutants: Conform to USEPA, Code of Federal Regulations, Title 40, Part 50 National Air Ambient Air Quality Standard. Refer to EPA Web Site <http://www.epa.gov/epahome/rules.html#codified>.
 6. Other Pollutants Not Listed: Not greater than 1/10 of Threshold Limit Value - Time Weighted Average (TLV-TWA) industrial workplace standard.
- B. Architectural Coatings - Volatile Organic Compound (VOC) Content Limits: Conform to US Environmental Protection Agency (EPA) Federal Register 48886/Vol. 63, No.176 Friday, September 11, 1998/ Rules and Regulations. Refer to EPA Web Site: <http://www.epa.gov/ttn/atw/eparules.html>.
- C. Do not use products in combination with or in contact with other products that can be identified as combining to form toxic fumes or sustained odors.
- D. Do not use solvents within interior areas that may penetrate and be retained in absorptive materials such as concrete, gypsum board, wood, cellulose products, fibrous material, and textiles.
- E. Protect construction materials from contamination and pollution from contact with construction dust, debris, fumes, solvents, and other environmentally polluting materials.
- F. Allow furnishings and materials such as carpet, floor tile, acoustical tile, textiles, office furniture, and casework, to air out in clean environment prior to installation.

3.3 HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

- A. Do not run permanent HVAC system during course of construction. Seal ductwork intake and exhaust vents.
- B. Heat, dehumidify, and ventilate building during course of Work as necessary to maintain environmental conditions suitable for drying and curing materials and for prevention of conditions suitable for mold and mildew growth.
 1. Ventilate building to remove moisture, dust, fumes, and odors.
 2. Temper and dehumidify air as needed to remove excess moisture.
 3. Do not use propane heaters and other moisture generating heating systems.
- C. Flush out building prior to commissioning. Refer to Section 01 45 23.13 "Testing for IAQ, Baseline IAQ, & Materials" for procedure.
- D. Inspect ductwork for refuse, contaminants, moisture and other foreign contamination prior to commissioning. Notify Commissioning Agent (CxA) of satisfactory inspection prior to beginning of Commissioning.
- E. Clean underfloor plenum at access flooring acting as supply air duct, prior to occupancy.

3.4 REMEDIAL ACTION

- A. Promptly take action as necessary to inspect and remediate conditions suspected of supporting microbial, fungal or mold conditions and where contaminated by indoor air pollution.
- B. Notify and consult with Architect prior to beginning remedial action where contamination by hazardous chemicals, microbes, and fungi is suspected.

END OF SECTION 01 57 30

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements governing the Contractor's selection of products for use in the Project.
- B. **Related Sections:** The following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section 01 25 00 "Substitution Procedures" specifies administrative procedures for handling requests for substitutions made after award of the Contract.
 - 2. Division 01 Section 01 33 00 "Submittal Procedures" specifies requirements for submittal of the Contractor's Construction Schedule and the Submittal Schedule.
 - 3. Division 01 Section 01 42 20 "Reference Standards and Definitions" specifies the applicability of industry standards to products specified.

1.3 DEFINITIONS

- A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.
 - 1. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - a. "Named Products" are items identified by the manufacturer's product name, including make or model number or other designation, shown or listed in the manufacturer's published product literature, which is current as of the date of the Contract Documents.
 - 2. "Materials" are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
 - 3. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

1.4 QUALITY ASSURANCE

- A. **Source Limitations:** To the fullest extent possible, provide products of the same kind from a single source.
- B. **Compatibility of Options:** When the Contractor is given the option of selecting between two (2) or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.
- C. **Nameplates:** Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products that will be exposed to view in occupied spaces or on the exterior.
 - 1. Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.
 - 2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
 - a. Name of product and manufacturer.
 - b. Model and serial number.
 - c. Capacity.
 - d. Speed.
 - e. Ratings.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
1. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 3. Deliver products to the site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Store products in accordance with manufacturers' instructions and maintain within temperature and humidity range required by manufacturer.
 4. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
 5. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
 6. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
 7. Store products subject to damage by the elements above ground, under cover in a weathertight enclosure, with ventilation adequate to prevent condensation.
 8. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.
 9. Store loose granular material on solid surfaces in a well-drained area; prevent mixing with foreign matter.
 10. Arrange storage to provide access for inspection. Periodically inspect to insure products are undamaged and are maintained under required conditions. Keep log showing date, time and problems, if any.
 11. Stone, masonry units and similar materials shall be stored on platforms or dry skids and shall be adequately covered and protected against damage.
 12. Materials and equipment shall be delivered, stored and handled to prevent intrusion of foreign matter and damage by weather or breakage. Packaged materials shall be delivered and stored in original, unbroken packages.
 13. Promptly inspect shipments to assure that products comply with requirements, that quantities are correct and products are undamaged.
 14. Packages, materials and equipment showing evidence of damage will be rejected and replaced at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION

- A. **General Product Requirements:** Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.
1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.
 2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
- B. **Product Selection Procedures:** The Contract Documents and governing regulations govern product selection. Procedures governing product selection include the following:
1. Semi-proprietary Specification Requirements: Where Specifications name two (2) or more products or manufacturers, provide one (1) of the products indicated. Comply with the requirements of Division 01 Section 01 25 00 "Substitution Procedures."
 2. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.

3. Compliance with Standards, Codes, and Regulations: Where Specifications only require compliance with an imposed code, standard, or regulation, select a product that complies with the standards, codes, or regulations specified.
4. Visual Selection: Where specified product requirements include the phrase "*...as selected from manufacturer's standard colors, patterns, textures...*" or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern, and texture from the product line selected.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS

- A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.
 1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION 01 60 00

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. General: This Section specifies administrative and procedural requirements for field engineering services including, but not limited to, the following:
 - 1. Land survey work.
 - 2. Civil Engineering services.
 - 3. Damage surveys.
 - 4. Geotechnical monitoring.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section 01 31 00 "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
 - 2. Division 01 Section 01 33 00 "Submittal Procedures" for submitting Project record surveys.
 - 3. Division 01 Section 01 77 00 "Closeout Procedures" for submitting final property survey with Project Record Documents and recording of Owner-accepted deviations from indicated lines and levels.

1.3 SUBMITTALS

- A. Certificates: Submit a certificate from the Land Surveyor stating that the control information furnished by the Owner is accurate or identify inaccuracies, if they exist. The Contractor shall not take advantage of errors, which may be included in the control information. Stakes and markings shall be preserved.
- B. Final Property Survey: Prepare and submit 10 copies of the final property survey.
- C. Project Record Documents: Submit a record of Work performed and record survey data as required under provisions of "Submittals" and "Project Closeout" Sections.

1.4 QUALITY ASSURANCE

- A. Provide field engineering services to establish and record grades, lines and elevations.
- B. The Contractor shall retain a Land Surveyor registered by the State of Connecticut to confirm State furnished base lines and benchmarks, lay out the building, underground utility lines and other site work from the information furnished by the Owner and to establish and record the necessary elevations, at no additional cost to the State.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Identification: The Owner will identify two (2) base lines on the Contract Drawings.
- B. Verify layout information shown on the Drawings, in relation to the property survey and existing benchmarks. Notify the Construction Administrator of any discrepancies immediately in writing before proceeding to lay out the Work. Locate and protect existing benchmarks and base line. Preserve permanent reference points during construction.
 - 1. Do not change or relocate benchmarks or base line without prior written approval. Promptly report lost or destroyed reference points or requirements to relocate reference points because of necessary changes in grades or locations.
 - 2. Promptly replace lost or destroyed Project baseline benchmarks. Base replacements on the original survey control points.

- C.** Establish and maintain a sufficient quantity of (minimum of 2) permanent benchmarks on the site, referenced to data established by Owner supplied information.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
- D.** Existing Utilities and Equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction.
 - 1. Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping. Notify the Construction Administrator of any discrepancies prior to proceeding.

3.2 PERFORMANCE

- A.** Work from lines and levels established by the property survey. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of the Project. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale Drawings to determine dimensions.
 - 1. Advise entities engaged in construction activities of benchmarks and control points for their use.
 - 2. As construction proceeds, check every major element for line, level, and plumb.
- B.** Surveyor's Log: Maintain a surveyor's log of control and other survey work. Make this log available for reference.
 - 1. Record deviations from required lines and levels, and advise the Construction Administrator when deviations that exceed indicated or recognized tolerances are detected. On Project Record Drawings, record deviations that are accepted and not corrected.
 - 2. On completion of foundation walls, major site improvements, underground utilities, and other Work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, elevations of construction, as-built locations and site work.
- C.** Site Improvements: Locate and lay out site improvements, including pavements, stakes for grading, fill and topsoil placement, utility slopes, and invert elevations.
- D.** Building Lines and Levels: Locate and lay out batter boards for structures, building foundations, column grids and locations, floor levels, and control lines and levels required for mechanical and electrical work.
- E.** Existing Utilities: Furnish information necessary to adjust, move, or relocate existing structures, utility poles, lines, services, or other appurtenances located in or affected by construction. Coordinate with local authorities having jurisdiction.
- F.** Final Property Survey: Prepare a final property survey showing significant features (real property) for the Project. Include on the survey a certification, signed by the surveyor, that principal metes, bounds, lines, and levels of the Project are accurately positioned as shown on the survey.

END OF SECTION 01 71 23

SECTION 017419 – CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section 018113 – Sustainable Design Requirements, for sustainable design goals and submittals.
- C. LEED Reference Guide for Building Design and Construction (BD+C), version 4, U.S. Green Building Council.
- D. LEED v4.1 Building Design and Construction (BD+C), Getting Started Guide for Beta Participants (Beta Guide), U.S. Green Building Council.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Waste Management Goals.
 - 2. Diversion and disposal of demolition and construction waste.
 - 3. Construction and Demolition Waste Management Plan (C+DWM Plan).
 - 4. C+DWM Plan implementation.
 - 5. Requirements and documentation for LEED Certification. The C+DWM Plan is part of the Project LEED Requirements.
 - 6. Appendix A: Sample Construction and Demolition Waste Tracking Log.
 - 7. Appendix B: Construction and Demolition Waste Calculator.
- B. Sustainable Design Requirements: The Owner requires the Contractor to implement practices and procedures to meet the Project’s environmental performance goals, which include achieving LEED v4 Certification. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project’s target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project’s sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project’s sustainability goals and LEED certification.

1.3 REFERENCES

- A. Abbreviations and Acronyms:
 - 1. ADC: Alternative Daily Cover

2. BD+C: Building Design + Construction
3. C+D: Construction and Demolition
4. C+DWM Plan: Construction and Demolition Waste Management Plan
5. CORR: Certification Institute's Certification of Real Rates
6. CRR: Construction Recycling and Reuse
7. LEED: Leadership in Energy and Environmental Design
8. NC: New Construction
9. USGBC: US Green Building Council

B. Definitions:

1. Alternative Daily Cover (ADC): Cover material other than soil placed on the surface of a municipal solid waste landfill at the end of each operating day to control vectors, fires, odors, blowing litter, and scavenging.
2. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
3. Commingled Waste: Waste streams that are combined on the project site and hauled away for sorting into recyclable streams. Commingled Waste is considered as one Diversion Stream unless diversion rates can be provided by the recycling facility for specific materials based on measured quantities.
4. Construction and Demolition Waste: Building and site improvement materials and other solid waste resulting from construction, demolition, remodeling, renovation, or repair operations. Construction waste includes packaging. Hazardous materials, land clearing debris, excavation soil, and landscaping materials are not included.
5. Construction and Demolition Waste Management Plan (C+DWM Plan): A project-specific plan for the collection, separation, handling, transportation, and disposal of waste generated at the construction site, to reduce the amount of waste sent to landfill or incineration.
6. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations. Hazardous materials, land clearing debris, excavation soil, and landscaping materials are not included.
7. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
8. Diversion: To remove, or have removed, from the site for recycling, reuse, salvage, donation, or wood combustion, materials that might otherwise be sent to a landfill or incinerator. Diversion from landfill does not include burning, incinerating, thermally destroying waste, or waste-to-energy processes, except for wood-derived fuel or wood combustion, which is considered diversion.
9. Diversion Rate: The percentage of material by weight that is diverted from landfill or incineration by Recycling, Salvage, Reuse, donation, or combustion (for wood only). The total weight of Recycled, Salvaged, Reused, and donated material, plus combusted wood, is the numerator; the total weight of Construction and Demolition Waste is the denominator. Land clearing debris, excavation soil and landscaping materials, and hazardous waste SHALL NOT be included in total weight of Construction and Demolition Waste for this calculation. ADC and non-wood waste used as incinerator fuel do not count

as diversion but must be included in total construction and demolition waste. Diversion Rate is also referred to as 'Recycling Rate'.

10. Diversion Stream: A flow of materials coming from a job site into markets for building materials, comprised of both a Material Category (or mixture of several material categories) and a Diversion Method. A Diversion Stream shall constitute at least five percent (5%), by weight or volume, of total diverted materials for the Project.
 - a. Examples of Diversion Streams include source separated materials sent to specific recycling facilities, commingled waste sent to a mixed-waste recycling facility, deconstructed materials sent back to a manufacturer as part of a take-back program, or salvaged materials reused on site.
 - b. Examples of Material Categories include the following. Each of these material categories below is considered a separate Diversion Stream when separated on site, however multiple materials that are commingled on site are considered one Diversion Stream. Commingled Waste may be considered as two Diversion Streams provided that all commingled waste is sent to an offsite sorting facility (or facilities) certified by the Recycling Certification Institute or approved equivalent, and the certification period covers the entire time period that waste is generated for the Project and sent to the facility.
 - 1) Metal
 - 2) Glass
 - 3) Plastic
 - 4) Wood
 - 5) Masonry
 - 6) Cardboard/paper
 - 7) Gypsum Board
 - 8) Ceiling Tile
 - 9) Carpet
 - c. Examples of Diversion Methods include:
 - 1) On-site Separation: Gypsum scrap; metal framing scrap; ceiling tile scrap; carpet scrap
 - 2) On-site waste diversion: Crushing concrete or asphalt for reuse onsite
 - 3) Reuse Off-site: Pallets; wood reels; blankets
 - 4) Salvage
 - 5) Donations: Tax deductible; non-tax deductible
11. Land Clearing Debris and Soil: Natural materials such as rock, soil, stone and vegetation. Excludes man-made materials even if found on-site pre-construction.
12. Non-Diversion Streams: Materials disposed of via landfills (including Alternative Daily Cover) or incinerators (excluding wood combustion).
13. Onsite Separation: Placing of selected materials in special containers or areas on the Project site to implement disposal in a segregated waste stream, for specialized recycling.
14. Packaging: Materials used for the protection or handling products delivered to the site, but which are not installed as part of the Work. Examples: Wood reels, pallets, blankets.

15. Recyclable: The ability of a product or materials to be recovered at the end of its life cycle and remanufactured into a new product.
16. Recycle (Recycling): Recovery of demolition and construction waste for subsequent processing in preparation for reuse.
17. Return: To send back reusable or unused products to vendors or manufacturers.
18. Reuse: Recovery of demolition or construction waste and subsequent incorporation on site into the Work of this Project.
19. Salvage: Recovery of demolition or construction waste from existing buildings or construction sites and subsequent sale or reuse in another facility.
20. Segregation: To place similar waste materials together for collection in a designated site area, trash bin, or roll-off container.
21. Source Reduction: Strategies minimizing potential waste that is brought to or generated on the site. Examples: Reduced packaging; industry standard dimensioned materials; prefabrication.
22. Waste Stream: Comprised of two major substreams: waste disposed of via landfills or incinerators and waste diverted from disposal through recycling, reuse, salvage, or donation (i.e., Diversion Stream). Land clearing debris, soil and landscaping materials, and hazardous waste do not qualify as a Waste Stream.
23. Waste-To-Energy: The conversion of non-recyclable waste materials into usable heat and/or fuel through a variety of processes such as combustion (not including the combustion of wood into wood-derived fuel), gasification, pyrolyzation, anaerobic digestion, and land fill gas.

C. Reference Standards

1. ISO/IEC Guide 65, General Requirements for Bodies Operating Product Certification Systems
2. ISO/IEC 17065, Conformity Assessment – Requirements for Bodies Certifying Products, Processes and Services
3. ISO 14000, Family of Standards

1.4 PERFORMANCE REQUIREMENTS

- A. Project Diversion Goal: The Owner has established a goal to achieve total diversion rate of a minimum of seventy five percent (75%) by weight for the total non-hazardous solid waste generated by the Work, including at least three (3) identified Diversion Streams.
- B. Alternative Daily Cover (ADC) must be accounted for in the waste diversion calculations, but for the purposes of LEED Certification, does not qualify as material diverted from disposal.
- C. General: Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials.

D. Diversion Requirements: Salvage, recycle, or reuse as much non-hazardous construction waste as possible. Diversion shall include, but not be limited to, the following waste categories as applicable to the Project:

1. Demolition Waste:
 - a. Asphalt paving.
 - b. Concrete.
 - c. Concrete reinforcing steel.
 - d. Brick.
 - e. Concrete masonry units.
 - f. Clean dimensional wood, trim, paneling, plywood, and oriented strand board.
 - g. Structural and miscellaneous steel.
 - h. Rough hardware.
 - i. Roofing materials.
 - j. Insulation.
 - k. Doors and frames.
 - l. Door hardware.
 - m. Windows.
 - n. Glass and Glazing.
 - o. Metal studs.
 - p. Gypsum board.
 - q. Acoustical tile and panels.
 - r. Carpet and Carpet pad.
 - s. Flooring materials.
 - t. Demountable partitions.
 - u. Casework.
 - v. Plumbing fixtures.
 - w. Piping.
 - x. Supports and hangers.
 - y. Electrical conduit.
 - z. Supports and hangers.
 - aa. Valves.
 - bb. Sprinklers.
 - cc. Mechanical equipment.
 - dd. Refrigerants.
 - ee. Electrical conduit.
 - ff. Copper wiring.
 - gg. Lighting fixtures.
 - hh. Lamps.
 - ii. Ballasts.
 - jj. Electrical devices.
 - kk. Switchgear and panelboards.
 - ll. Transformers.

2. Construction Waste:
 - a. Masonry and CMU.
 - b. Lumber.

- c. Wood sheet materials.
 - d. Wood trim.
 - e. Metals.
 - f. Roofing.
 - g. Insulation.
 - h. Carpet and pad.
 - i. Gypsum board.
 - j. Piping.
 - k. Electrical conduit.
 - l. Packaging: Regardless of diversion goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
 - 1) Paper.
 - 2) Cardboard.
 - 3) Boxes.
 - 4) Plastic sheet and film.
 - 5) Polystyrene packaging.
 - 6) Wood crates.
 - 7) Plastic pails.
 - m. Waste generated by on-site workers, such as plastic and metal beverage containers.
- E. Hazardous Waste: Take appropriate measures for safe collection, storage and disposal of hazardous waste (e.g. batteries, mercury-containing lamps, e-waste), in accordance with all applicable law, codes, and standards.

1.5 SUBMITTALS

- A. General: Submit the following according to Conditions of the Construction Contract and Division 01 Specification Sections. Quantities shall be indicated using weight (lbs. or tons) throughout the duration of the Project.
- B. Construction and Demolition Waste Management Plan (C+DWM Plan): Within 30 days of date established for the Notice to Proceed, submit for approval a detailed C+DWM Plan in accordance with the following requirements:
 - 1. Project Diversion Goal, as outlined in this Section.
 - 2. Identify responsible parties for C+DWM Plan implementation.
 - 3. Waste Identification: Identify Material Categories targeted for diversion, but at a minimum five.
 - 4. For each Material Category, identify Diversion Method, including but not limited to:
 - a. On-site Separated
 - b. Commingled
 - c. Re-Use: Wood pallets; Wooden reels; Blankets
 - d. Salvage (when applicable)
 - e. Sale or Donation (when applicable)
 - 5. List all Diversion Streams applicable to the Project, but at a minimum three (3).

6. Describe Project-specific means and methods by which waste generated by the Project will be diverted or disposed:
 - a. Materials Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including whether waste will be segregated on-site or commingled and separated off-site, means by which recyclable materials will be protected from contamination, sizes of containers, container labeling procedures, and designated location where materials separation will be performed.
 - b. Describe source reduction strategies to reduce the quantity of C+D waste generated by the Project (e.g., take back of reusable material packaging, such as wood reels, pallets, or blankets).
 - c. Waste Hauling Procedures:
 - 1) Identify names, addresses, and telephone numbers of all Waste Haulers which will be hauling waste materials for the Project.
 - 2) Provide sample waste hauler contract, including waste reporting structure; sample waste report; responsible parties; contact information; and chain of communication.
 - d. Sorting and Recycling Facility Procedures:
 - 1) Identify names, addresses, and telephone numbers of all sorting, recycling, and disposal facilities which will be accepting waste materials for the Project.
 - 2) For facilities that will be accepting commingled waste materials for the Project, identify the local or state authority that regulates the facility. Identify if the facility is certified by the Recycling Certification Institute or approved equivalent.
 - 3) Describe how all sorting, recycling, and disposal facilities will process waste materials for the Project. Visual inspection is not an acceptable method of evaluation for determining diversion rate of commingled waste streams.
 - e. Salvage, Sale and Donation Procedures:
 - 1) Identify names, addresses, and telephone numbers of all individuals and organizations which will be accepting waste materials for the Project.
 - 2) For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
 - f. Landfill and Incineration Facility Procedures:
 - 1) Indicate how and where materials will be disposed of.
 - 2) Include name, address, and telephone number of each landfill and incinerator facility. Distinguish between wood and non-wood waste sent to incinerator.
 - g. Other Disposal Procedures: Account for and describe disposal method for all other waste materials, including those that will not contribute to diversion from landfill. Non-recyclable waste should be distinguished from non-diverted waste that cannot be included in Diversion Rate calculation, including:
 - 1) Land clearing debris
 - 2) Excavation soil and rock
 - 3) Hazardous Materials (provide summary of materials and identify safe removal and disposal strategies for each material)

7. Kick-off meeting and additional meetings as required informing Subcontracted Trades of requirements, and monitoring their progress towards the Project goals.
 8. Waste Reduction Tracking and Documentation: Describe Project-specific means and methods by which diverted or disposed waste generated by the Project will be tracked for reporting.
 - a. Retain waste hauler reports.
 - b. Retain tickets or receipts for all waste disposal at landfill facilities.
 - c. Record estimated weight of materials that are reused or salvaged.
 - d. Retain receipts and record estimated weight of materials that are donated or sold.
 9. C+D Waste Estimates: Estimate expected diversion rates for each material stream applicable to the Project.
- C. Waste Hauler(s) C+D Progress Report: The Waste Hauler(s) shall submit progress reports to the Contractor on a monthly basis. The Waste Hauler(s) C+D Progress Report shall include the following information for the time period covered:
1. The names of all Waste Streams per the C+DWM Plan. This includes Diversion Streams and Non-Diversion streams.
 2. The name and address of the sorting, recycling, or disposal facility for each Waste Stream.
 3. Weight for each Waste Stream.
 4. Total weight of waste.
- D. Contractor C+D Progress Report: The Contractor shall submit progress reports to the Owner on a monthly basis prior to application for payment. Contractor shall track demolition and construction waste diversion throughout the project and maintain documentation of materials and disposal methods. Progress Reports shall include the following information for the time period covered:
1. Compiled information from all Waste Haulers for all Waste Streams into a single report.
 2. Updated Construction & Demolition Waste Tracking Log (see Appendices of this Section) for all waste hauled from site, identifying:
 - a. Date of pick-up by Waste Hauler
 - b. Waste Hauler Name
 - c. Gross Total quantity, measured by weight, of demolition and construction waste hauled from the Project site during the period.
 - d. Quantity of materials disposed of in landfills or incineration facilities as a percentage of total waste during the period.
 - e. Quantity of materials, measured by weight, diverted by methods of recycling, reuse, salvage, and/or donations during the period. Include breakdown of diverted waste for major material types, including but not limited to:
 - 1) Asphalt
 - 2) Cardboard and Papers
 - 3) Carpet and Pad
 - 4) Gypsum Board
 - 5) Wood
 - 6) Commingled Waste
 - 7) Metals

- 8) Glass
 - 9) Masonry
 - 10) Vinyl
 - 11) Concrete
 - 12) Plastic
 - 13) Ceiling Tile
 - f. Quantity of land clearing debris, excavation soil, and hazardous material (if applicable). Note that these materials shall be reported but excluded from Waste Diversion Calculations.
 - g. Diverted waste as a percentage of total waste, for the period and cumulative for the project-to-date.
- E. Waste Hauler(s) Sorting Facility Reports: For each waste receiving facility, the Waste Haulers shall provide Sorting Facility Data on sorting facility letterhead to the Contractor each calendar year:
- 1. Name and address of sorting facility.
 - 2. State regulation, license and license number under which the facility operates.
 - 3. End-use information for each Diversion Stream. Provide the following:
 - a. Receiver Information– Facility/Party receiving material from the Sorting Facility
 - b. End Product Information– How material is used by the Receiver (e.g. manufactured into water bottles, used as feedstock for new steel products).
 - 4. If mixed construction and demolition (C+D) waste will be commingled on-site and diverted off-site, provide the following:
 - a. Verification of Diversion Rate: Provide project-specific and/or facility-wide diversion rates in accordance with the following:
 - 1) Project-Specific: On Sorting Facility letterhead, provide project-specific monthly summaries of diversion rates from each waste receiving facility for each Diversion Stream the facility accepts, including statement that visual inspection was not used to estimate weights of Project Diversion Streams. ADC must be listed as a separate line item on the report under the category of non-diverted waste.
 - 2) Facility-Wide: On Sorting Facility letterhead, provide facility-wide aggregated annual averaged diversion rates, average percentage of ADC produced by the facility, and provide documentation that the facility’s method of recording and calculating these rates is regulated by a local or state government authority. The facility-wide aggregated annual averaged diversion rate shall include ADC under the category of non-diverted waste.
 - b. Third-party Certification of Diversion Rate: If the sorting facility has third-party verified facility-wide diversion rates according to Recycling Certification Institute’s Certification of Real Rates (CORR) Protocol or approved equivalent, provide documentation of the independent third-party certification.
- F. Contractor Sorting Facility Report: The Contractor shall provide Sorting Facility Reports for each sorting facility once annually to Owner. If multiple waste haulers or receiving facilities are utilized on the Project, then the Contractor shall aggregate individual reports on an annual basis.

- G. Waste Management Records: Contractor shall maintain the following records and provide to Owner upon request.
1. Recycling and Processing Facility Records: Document receipt and acceptance of recyclable waste by licensed recycling and processing facilities. Include legible copies of on-site logs, manifests, weight tickets, receipts, and invoices.
 2. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include legible copies of manifests, weight tickets, receipts, and invoices.
 3. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and charitable organizations. Indicate whether organization is tax exempt.
 4. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- H. Qualification Data: For Waste Management Coordinator, submit data within 30 days of date established for the Notice to Proceed confirming compliance with Waste Management Coordinator Qualifications.
- I. Refrigerant Recovery Report: Submit as refrigerant recovery activities are completed on site, if applicable:
1. Qualification Data for refrigerant recovery technician, indicating Refrigerant Recovery Technician Qualifications are met.
 2. Statement of Refrigerant Recovery:
 - a. Date refrigerant was recovered.
 - b. Statement that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations, signed by refrigerant recovery technician responsible for recovering refrigerant.
 - c. Name, address and telephone number of refrigerant technician.

1.6 CLOSEOUT SUBMITTALS

- A. Provide final approved C+DWM Plan and summary table indicating site-separated waste, by diverted material type, that indicates the total percentage of construction waste diverted from landfill and the identified Diversion Streams prior to request for Substantial Completion.
- B. LEED v4.1 Construction and Demolition Waste Calculator. At the completion of waste management activities for the Project and prior to final application for payment, the Contractor shall provide a completed LEED v4.1 Excel Calculator to the Owner summarizing the final diversion and disposal quantities for LEED documentation purposes.
1. A copy of the LEED v4.1 Construction and Demolition Waste Calculator can be downloaded from: <https://www.usgbc.org/resources/leed-v41-construction-and-demolition-waste-management-calculator>. A sample is provided in the Appendices of this Section.
 2. The LEED v4.1 Construction and Demolition Waste Calculator shall include:
 - a. Material description and material type for each material stream.
 - b. Cumulative waste for each material stream, measured by weight, for Project to date.

- c. Average commingled recycling rate of the sorting facility used during the project active timeline, both with and without the ADC in the recycling rate.
 - d. Disclosure of certified commingled recycling facility.
 - e. Percent of each material stream diverted.
 - f. Cumulative quantity of each material stream sent to landfill, measured by weight.
 - g. Cumulative diverted waste as a percentage of total waste.
 - h. Gross Total quantity of demolition and construction waste generated on site.
 - i. Gross Total quantity of demolition and construction waste diverted from landfill.
 - j. Total number of material streams tracked for the Project.
 - k. Calculations may be performed using either weight (lbs. or tons), however the method shall be consistent throughout the duration of the Project.
3. Name and location of the recycling or disposal facility that accepted each material.
- C. Waste Hauler(s) Final C+D Report:
1. Submit to Contractor prior to request for Substantial Completion.
 2. Include following information covering the entire time period for Waste Hauler's scope of work:
 - a. The names of the Waste Streams per the C+DWM Plan.
 - b. The name of the sorting or disposal facility for each Waste Stream.
 - c. Sorting Facility Report for each disposal facility.
 - d. Weight for each Waste Stream.
 - e. Total quantity of waste, measured by weight.
 - f. Final Diversion (Recycling) Rate
 3. Provide backup documentation concurrent with the Waste Hauler's Final C+D Report:
 - a. Recycling and Processing Facility Records: Document receipt and acceptance of recyclable waste by licensed recycling and processing facilities. Include legible copies of on-site logs, manifests, weight tickets, receipts, and invoices.
 - b. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include legible copies of manifests, weight tickets, receipts, and invoices.
 - c. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and charitable organizations. Indicate whether organization is tax exempt.
 - d. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- D. Contractor Final C+D Report:
1. Compile Waste Hauler(s) Final C+D Reports into a single Final Project C+D Report.
 2. Submit following Substantial Completion and prior to final Application for Payment. The final date of submission will be set by the Owner.
 3. Copies of annual Waste Hauler's Sorting Facility Reports, covering entire Project time period.

1.7 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: Experienced firm, with a record of successful waste management coordination of projects with similar requirements, that employs a LEED-Accredited Professional, certified by the USGBC, as waste management coordinator. Waste management coordinator may also serve as the Contractor's LEED coordinator.
- B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- C. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- D. Sorting and Recycling Facility Qualifications: Each commingled recycling facility must be regulated by a local or state authority.
- E. Waste Management Conference: Conduct conference at Project site to comply with requirements in Division 01 Section for "Project Management and Coordination". Review methods and procedures related to waste management including, but not limited to, the following:
 - 1. Review and discuss waste management plan including responsibilities of Waste Management Coordinator.
 - 2. Review requirements for documenting quantities of each type of waste and its disposition.
 - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 - 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 - 5. Review waste management requirements for each trade.
- F. Project Meetings: Waste management plans and implementation shall be discussed at the following meetings:
 - 1. Pre-demolition meeting.
 - 2. Pre-construction meeting.
 - 3. Regular job-site meetings.
 - 4. Sub-contractor job-site coordination meetings.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
 - 1. Comply with operation, termination, and removal requirements in Division 01 Section for Temporary Facilities and Controls.
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
 - 1. Distribute C+DWM Plan to all impacted parties within three (3) days of submittal return.
 - 2. Distribute C+DWM Plan to entities when they first begin work on-site. Review plan procedures and locations established for diversion and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold. Provide labeling in multiple languages as needed to enable proper communication and understanding.
 - 2. Comply with Division 01 Section for Temporary Facilities and Controls for requirements to control dust and dirt, environmental protection, and noise control.
- E. Waste Management in Historic Zones or Areas: Hauling equipment and other materials shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, by 12 inches or more.

3.2 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 - 3. Store items in a secure area until installation.

4. Protect items from damage during transport and storage.
 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- B. Salvaged Items for Sale and Donation: Not permitted to be stored on Project site.
- C. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:
1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area off-site.
 5. Protect items from damage during transport and storage.
- D. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.
- E. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
- F. Plumbing Fixtures: Separate by type and size.
- G. Lighting Fixtures: Separate lamps by type and protect from breakage.
- H. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.
- 3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL
- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Owner.
- C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical. At a minimum, three (3) Diversion Streams are required.
1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

- a. Inspect containers and bins for contamination and remove contaminated materials if found.
2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.4 RECYCLING DEMOLITION WASTE

- A. Asphaltic Concrete Paving: Break up and transport paving to asphalt-recycling facility.
- B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
 1. Pulverize concrete to maximum 1-1/2-inch size.
- C. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
 1. Pulverize masonry to maximum 3/4-inch size.
 2. Clean and stack undamaged, whole masonry units on wood pallets.
- D. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- E. Metals: Separate metals by type.
 1. Structural Steel: Stack members according to size, type of member, and length.
 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- F. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.
- G. Metal Suspension System: Separate metal members including trim, and other metals from acoustical panels and tile and sort with other metals.
- H. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.
 1. Store clean, dry carpet and pad in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.
- I. Carpet Tile: Remove debris, trash, and adhesive.
 1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.

- J. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.
- K. Lighting Fixtures: Separate lamps by type and protect from breakage.
- L. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.
- M. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
- N. Conduit: Reduce conduit to straight lengths and store by type and size.

3.5 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
 - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 - 2. Polystyrene Packaging: Separate and bag materials.
 - 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 - 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Wood Materials:
 - 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
 - 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
- C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

3.6 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.

- C. Retain second "Disposal" Paragraph below if disposal is permitted on Owner's property; revise, if applicable, to indicate limits on type of materials that may be disposed of on-site.
- D. Disposal: Remove waste materials from Owner's property and legally dispose of them.

3.7 APPENDICES

- A. APPENDIX A-017419 – SAMPLE CONSTRUCTION AND DEMOLITION WASTE TRACKING FORM
- B. APPENDIX B-017419 – SAMPLE LEED V4.1 CONSTRUCTION AND DEMOLITION WASTE CALCULATOR

- END OF SECTION 017419 -

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A.** Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A.** This Section includes administrative and procedural requirements for handling requests for building system start up and system demonstration and includes the following:
 - 1. Starting Systems.
 - 2. Demonstration and instructions.
 - 3. Testing, adjusting, and balancing.
- B.** Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section 01 45 00 "Quality Control" specifies quality assurance and inspecting services.
 - 2. Division 01 Section 01 77 00 "Closeout Procedures" specifies requirements for contract close out requirements for system operation and maintenance data and extra materials.
 - 3. Division 01, Section 01 91 00 "Commissioning" specifies process requirements for system commissioning.
 - 4. Division 23, Section 23 08 00 "Commissioning of HVAC" specifies requirements HVAC&R system commissioning.

1.3 STARTING SYSTEMS

- A.** Coordinate schedule for start-up of various equipment and systems.
- B.** Provide written notification to the Construction Administrator 30 days prior to start-up of each item.
- C.** Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, and control sequence for other conditions that may cause damage.
- D.** Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E.** Verify that wiring and support components are complete and tested.
- F.** Execute the start-up under supervision of manufacturer's representative, in accordance with manufacturer's instructions.
- G.** When referenced in individual specification sections, require manufacturer to provide an authorized representative to be present at the site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H.** Submit a written report in accordance with Division 01 Section 01 45 00 "Quality Control" that the equipment or system has been properly installed and is functioning properly.

1.4 DEMONSTRATION AND INSTRUCTIONS

- A.** Demonstrate operation and maintenance of Products to Owner and Agency Personnel fourteen (14) days prior to substantial completion.
- B.** Demonstrate Project equipment and instruct in a classroom environment at location designated by the Construction Administrator and instructed by a qualified manufacturer's representative who is knowledgeable about the Project.
- C.** For equipment or systems requiring seasonal operation perform demonstration for season within six (6) months.
- D.** Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner and Agency Personnel in detail to explain all aspects of operation and maintenance.
- E.** Demonstrate start-up, operation, control, adjustment, troubleshooting, servicing, and maintenance, and shutdown of each item at agreed upon scheduled time and at equipment or designated location.

- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during demonstration.
- G. Starting and adjusting equipment does not constitute acceptance by the owner since commissioning is a requirement of this contract. Additionally, the warrantee does not begin until substantial completion has been granted for that specific item.

1.5 TESTING, ADJUSTING, AND BALANCING

- A. The Contractor will employ and pay for the testing services of an independent consultant to verify the testing, adjusting, and balancing.
 - 1. Comply with the requirements of Division 01 Section 01 91 00 "Commissioning" as they relate to the Work of this Section.
- B. Reports will be submitted by the independent testing consultant to the Construction Administrator indicating observations and results of tests and indicating compliance or non-compliance with the requirements of the Contract Documents.
- C. The Owner may employ and pay for the services of an independent consultant to verify testing, adjusting, and balancing which was performed by the Contractor.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 75 00

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A.** Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A.** This Section includes administrative and procedural requirements for contract closeout including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Project record document submittal.
 - 3. Operation and maintenance manual submittal.
 - 4. Submittal of warranties.
 - 5. Final cleaning.
- B.** Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section 01 11 00 "Summary of Work".
 - 2. Division 01 Section 01 29 76 "Progress Payment Procedures".
- C.** Closeout requirements for specific construction activities may be included in the appropriate Sections in Divisions 02 through 49.

1.3 SUBSTANTIAL COMPLETION

- A.** General: Basic contract definitions are included in Article 1 of the General Conditions of the Contract for Construction.
- B.** Preliminary Procedures: Before requesting inspection for Certification of Substantial Completion, complete the following. List exceptions in the request.
 - 1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete.
 - a. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
 - b. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
 - 2. Advise the Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, certificates of compliance, operating certificates, and similar releases.
 - 5. Submit record drawings, maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
 - 6. Deliver tools, spare parts, extra stock, and similar items.
 - 7. Make final changeover of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of changeover in security provisions.
 - 8. Demonstrate, thru operation and testing, the functions of all systems and/or equipment to the satisfaction of the Owner for compliance to the Contract. Complete testing of systems and instruction of the Owner's operation and maintenance personnel. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.
 - 9. Complete final cleanup requirements.
 - 10. Certify that required training of personnel is complete.

- C. Inspection Procedures: The Contractor shall be ready and prepared when they request a Substantial Completion inspection. If the inspection reveals that the work is not complete, that there are extensive punchlist items that will take more than ninety (90) days to complete and as the items listed in Article 1.3 above are not complete, the Construction Administrator, Architect, and Owner will determine the inspection has failed.
- D. The Contractor is responsible for all costs to re-inspect due to a failed inspection. The Owner will issue a deduct change order to cover all costs for re-inspection.
 - 1. The Architect will repeat inspection when requested and assured that the Work is substantially complete.
 - 2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.4 ACCEPTANCE

- A. Preliminary Procedures: Before requesting final inspection for "Certificate of Acceptance" and final payment, complete the following. List exceptions in the request.
 - 1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
 - 2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
 - 3. Submit a certified copy of the Architect's final inspection list of items to be completed or corrected, endorsed and dated by the Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Architect.
 - 4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion or when the Owner took possession of and assumed responsibility for corresponding elements of the Work.
 - 5. Submit consent of surety to Final Payment.
 - 6. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 - 7. Touch up and otherwise repair and restore marred, exposed finishes, including touchup painting.
- B. Re-inspection Procedure: The Inspection Group will re-inspect the Work upon receipt of notice from the Construction Administrator that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Owner.
 - 1. Upon completion of re-inspection, the Construction Administrator will prepare a Certificate of Acceptance. If the Work is incomplete, the Construction Administrator will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

1.5 AS-BUILT DOCUMENT SUBMITTALS

- A. General: The Contractor shall not use As-built Drawings for construction purposes. Protect contractor As-built Drawings from deterioration and loss in a secure, fire-resistant location. Provide access to As-built Drawings for the Architect's reference during normal working hours. Keep documents current; do not permanently conceal any work until required information has been recorded. IMPORTANT NOTE: Failure to keep As-built Documents current is sufficient cause to withhold progress payments.
 - 1. The Contractor shall also hire the services of a Surveyor registered in the State of Connecticut to conduct a final survey to determine the location of exterior underground utility lines and to record the results, and update existing electronic media.
 - 2. The record of exterior underground utilities shall be made at the time of installation on Mylar film drawing and AutoCAD (latest version) compatible disks. The drawing shall bear the seal of the Land Surveyor and a statement of accuracy.
- B. As-built Drawings: The Contractor shall maintain one (1) clean, complete undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date. Update As-built Drawings on a monthly basis coincident with the submittal of the Application for Payment.
 - 1. Mark record sets with erasable pencil to distinguish between variations in separate categories of the Work.
 - 2. Mark all new information that is not shown on Contract Drawings.

3. Note related change-order numbers where applicable.
 4. Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.
 5. Upon completion of the work, the Contractor shall submit Record Drawings to the Construction Administrator for the Owner's Records who will pass them on to the Architect or Engineer for transferring the changes to the Record Drawing Mylar Tracings.
 6. Submit electronic format data of all Coordination Drawings as required by the Owner, at no additional cost.
 7. Refer to Section 01 45 00 "Quality Control" Article 1.3 for required as-built drawings and specifications for fire alarm systems.
- C. Record Specifications:** The Contractor shall maintain one (1) complete copy of the Project Manual, including Addenda. Include with the Project Manual one (1) copy of other written construction documents, such as Change Orders and modifications issued in printed form during construction.
1. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
 2. Give particular attention to equals and substitutions and selection of options and information on concealed construction that cannot otherwise be readily discerned later by direct observation.
 3. Note related record drawing information and Product Data.
 4. Upon completion of the Work, submit Record Specifications to the Construction Administrator for the Owner's records.
- D. Record Product Data:** The Contractor shall maintain one (1) copy of each Product Data submittal. Note related Change Orders and markup of record drawings and Specifications.
1. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site and from the manufacturer's installation instructions and recommendations.
 2. Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation.
 3. Upon completion of markup, submit complete set of Record Product Data to the Construction Administrator for the Owner's records.
- E. Record Sample Submitted:** Immediately prior to Substantial Completion, the Contractor shall meet with the Construction Administrator, Architect and the Owner's personnel at the Project Site to determine which Samples are to be transmitted to the Owner for record purposes. Comply with the Owner's instructions regarding delivery to the Owner's Sample storage area.
- F. Miscellaneous Record Submittals:** Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to the Construction Administrator for the Owner's records.
- G. Maintenance Manuals:** Organize operation and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual, heavy-duty, 2-inch, 3-ring, vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder according to Division 01 Section 01 78 23 "Operation & Maintenance Data". Included but not limited to the following types of information:
1. Emergency instructions.
 2. Spare parts list.
 3. Copies of warranties.
 4. Wiring diagrams.
 5. Recommended "turn-around" cycles.
 6. Inspection procedures.
 7. Shop Drawings and Product Data.
 8. Fixture lamping schedule.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES

- A.** Operation and Maintenance Instructions: Arrange for each Installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:
1. Maintenance manuals.
 2. Record documents.
 3. Spare parts and materials.
 4. Tools.
 5. Lubricants.
 6. Fuels.
 7. Identification systems.
 8. Control sequences.
 9. Hazards.
 10. Cleaning.
 11. Warranties and bonds.
 12. Maintenance agreements and similar continuing commitments.
- B.** As part of instruction for operating equipment, demonstrate the following procedures:
1. Startup.
 2. Shutdown.
 3. Emergency operations.
 4. Noise and vibration adjustments.
 5. Safety procedures.
 6. Economy and efficiency adjustments.
 7. Effective energy utilization.

3.2 FINAL CLEANING

- A.** General: The General Conditions require general cleaning during construction. Regular site cleaning is included in Division 01 Section 01 50 00 "Temporary Facilities and Controls."
- B.** Cleaning: Employ professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
1. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion and Certification of Occupancy.
 2. Interior:
 - a. Remove labels that are not permanent labels.
 - b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Remove paint spots; wash and polish glass.
 - c. Clean exposed interior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.

- d. Wash washable surfaces of mechanical, electrical equipment and fixtures and replace filters, clean strainers on mechanical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
 - e. Clean and polish finish hardware.
 - f. Clean and polish tile and other glazed surfaces.
 - g. Clean floors; wax and buff resilient tile. Clean vinyl or rubber base.
 - h. Vacuum and/or dust walls, ceilings, lighting fixtures, ceiling diffusers and other wall and ceiling items.
 - i. Remove defacements, streaks, fingerprints and erection marks.
3. Exterior:
- a. Clean the site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth, even-textured surface.
 - b. Clean exposed exterior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances.
 - c. Clean roofs, gutters and downspouts.
 - d. Remove waste and surplus materials, rubbish and construction equipment and facilities from the site, and deposit it legally elsewhere.
 - e. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Remove paint spots; wash and polish glass.
- C.** Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid the work of rodents, insects, and other pests. Provide results of final inspection in writing.
- D.** Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.
- E.** Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.
- 1. Where extra materials of value remain after completion of associated Work, they become the Owner's property. Dispose of these materials as directed by the Construction Administrator.
 - 2. Leave building clean and ready for occupancy. If the Contractor fails to clean up, the Owner may do so, with the cost charged to the Contractor. The Owner will issue a credit change order to cover the costs.

END OF SECTION 01 77 00

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Division 00 General Conditions and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for operation and maintenance manuals, including the following:
1. Preparing and submitting operation and maintenance manuals for building operating systems and equipment.
 2. Preparing and submitting instruction manuals covering the care, preservation, and maintenance of architectural products and finishes.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
1. Division 01 Section 01 33 00 "Submittal Procedures" specifies preparation of Shop Drawings and Product Data.
 2. Division 01 Section 01 75 00 "Starting and Adjusting" specifies instruction of the Owner and Agency operating personnel in the operation and maintenance of building systems and equipment and the general requirements for starting-up equipment and systems.
 3. Division 01 Section 01 77 00 "Closeout Procedures" specifies general closeout requirements.
 4. Division 01 Section 01 78 30 "Warranties and Bonds" specifies requirements for submittal of warranties and bonds.
 5. Division 01 Section 01 81 13 "Sustainable Design Requirements" specifies requirements for submittals related to green building certification.
 6. Division 01 Section 01 91 00 "Commissioning" specifies requirements for submittals related Commissioning.
 7. Appropriate Sections of Divisions 02 through 49 specify special operation and maintenance data requirements for specific pieces of equipment or building operating systems.

1.3 QUALITY ASSURANCE

- A. Maintenance Manual Preparation: In preparation of maintenance manuals, use personnel thoroughly trained and experienced in operation and maintenance of equipment or system involved.
1. Where maintenance manuals require written instructions, use personnel skilled in technical writing where necessary for communication of essential data.
 2. Where maintenance manuals require drawings or diagrams, use draftsmen capable of preparing drawings clearly in an understandable format.
- B. Instructions for the Owner and Agency Personnel: The Construction Manager must use experienced instructors thoroughly trained and experienced in operation and maintenance of equipment or system involved, to instruct the Owner's operation and maintenance personnel.
- C. Commissioning (Cx) Coordination: The Commissioning process requires detailed O&M documentation. The Contractor must submit O&M manuals to the Construction Administrator for review and approval by Commissioning Agent (CxA).

1.4 SUBMITTALS

- A. Submittal Schedule: Comply with the following schedule for submitting operation and maintenance manuals:
1. Before Substantial Completion, when each installation that requires operation and maintenance manuals is nominally complete, submit four (4) draft copies of each manual to the Owner's Representative, Commissioning Agent (CxA), Agency Representative, and Architect for review. Include a complete index or table of contents of each manual.
 - a. The Owner's Representative will return one (1) copy of the draft with comments within twenty - one (21) calendar days of receipt.

10. Precautions against improper use and maintenance.
 11. Copies of warranties.
 12. Repair instructions including spare parts listing.
 13. Sources of required maintenance materials and related services.
 14. Manual index.
- B.** Organize each manual into separate sections for each piece of related equipment. As a minimum, each manual shall contain a title page; a table of contents; copies of product data, supplemented by drawings and written text; and copies of each warranty, bond, and service contract issued.
1. Title Page: Provide a title page in a transparent, plastic envelope as the first sheet of each manual. Provide the following information:
 - a. Subject matter covered by the manual.
 - b. Name and address of the Project.
 - c. Date of submittal.
 - d. Name, address, and telephone number of the Construction Manager.
 - e. Name and address of the Architect and Owner's Representative.
 - f. Cross-reference to related systems in other operation and maintenance manuals.
 2. Table of Contents: After title page, include a typewritten table of contents for each volume, arranged systematically according to the Project Manual format. Include a list of each product included, identified by product name or other appropriate identifying symbol and indexed to the content of the volume.
 - a. Where a system requires more than one volume to accommodate data, provide a comprehensive table of contents for all volumes in each volume of the set.
 3. Provide a general information section immediately following table of contents, listing each product included in the manual, identified by product name. Under each product, list the name, address, and telephone number of the subcontractor or Installer and the maintenance subcontractor. Clearly delineate the extent of responsibility of each of these entities. Include a local source for replacement parts and equipment.
 4. Product Data: Where the manuals include manufacturer's standard printed data, include only sheets that are pertinent to the part or product installed. Mark each sheet to identify each part or product included in the installation. Where the Project includes more than one (1) item in a tabular format, identify each item, using appropriate references from the Contract Documents. Identify data that is applicable to the installation, and delete references to information that is not applicable.
 5. Written Text: Prepare written text to provide necessary information where manufacturer's standard printed data is not available, and the information is necessary for proper operation and maintenance of equipment or systems. Prepare written text where it is necessary to provide additional information or to supplement data included in the manual. Organize text in a consistent format under separate headings for different procedures. Where necessary, provide a logical sequence of instruction for each operation or maintenance procedure.
 6. Drawings: Provide specially prepared drawings where necessary to supplement manufacturer's printed data to illustrate the relationship of component parts of equipment or systems or to provide control or flow diagrams. Coordinate these drawings with information contained in project record drawings to assure correct illustration of the completed installation.
 - a. Do not use original Record Documents as part of operation and maintenance manuals.
 7. Warranties and/or Bonds: Provide a copy of each warranty and/or bond in the appropriate manual for the information of the Owner's operating personnel. Provide written data outlining procedures to follow in the event of product failure. List circumstances and conditions that would affect validity of warranty or bond.

1.6 MATERIAL AND FINISHES MAINTENANCE MANUAL

- A.** Submit four (4) copies of each manual, in final form, on material and finishes to the Owner's Representative for distribution. Provide one (1) section for architectural products, including applied materials and finishes. Provide a second section for products designed for moisture protection and products exposed to the weather.
1. Refer to individual Specification Sections for additional requirements on care and maintenance of materials and finishes.

- B.** Architectural Products: Provide manufacturer's data and instructions on care and maintenance of architectural products, including applied materials and finishes.
 - 1.** Manufacturer's Data: Provide complete information on architectural products, including the following, as applicable:
 - a.** Manufacturer's catalog number.
 - b.** Size.
 - c.** Material composition.
 - d.** Color.
 - e.** Texture.
 - f.** Reordering information for specially manufactured products.
 - 2.** Care and Maintenance Instructions: Provide information on care and maintenance, including manufacturer's recommendations for types of cleaning agents to be used and methods of cleaning. Provide information on cleaning agents and methods that could prove detrimental to the product. Include manufacturer's recommended schedule for cleaning and maintenance.
- C.** Moisture Protection and Products Exposed to the Weather: Provide complete manufacturer's data with instructions on inspection, maintenance, and repair of products exposed to the weather or designed for moisture-protection purposes.
 - 1.** Manufacturer's Data: Provide manufacturer's data giving detailed information, including the following, as applicable:
 - a.** Applicable standards.
 - b.** Chemical composition.
 - c.** Installation details.
 - d.** Inspection procedures.
 - e.** Maintenance information.
 - f.** Repair procedures.

1.7 EQUIPMENT AND SYSTEMS MAINTENANCE MANUAL

- A.** Submit four (4) copies of each manual, in final form, on equipment and systems to the Owner's Representative for distribution. Provide separate manuals for each unit of equipment, each operating system, and each electric and electronic system.
 - 1.** Refer to individual Specification Sections for additional requirements on operation and maintenance of the various pieces of equipment and operating systems.
- B.** Equipment and Systems: Provide the following information for each piece of equipment, each building operating system, and each electric or electronic system.
 - 1.** Description: Provide a complete description of each unit and related component parts, including the following:
 - a.** Equipment or system function.
 - b.** Operating characteristics.
 - c.** Limiting conditions.
 - d.** Performance curves.
 - e.** Engineering data and tests.
 - f.** Complete nomenclature and number of replacement parts.
 - 2.** Manufacturer's Information: For each manufacturer of a component part or piece of equipment, provide the following:
 - a.** Printed operation and maintenance instructions.
 - b.** Assembly drawings and diagrams required for maintenance.
 - c.** List of items recommended to be stocked as spare parts.
 - 3.** Maintenance Procedures: Provide information detailing essential maintenance procedures, including the following:

4. Operating Procedures: Provide information on equipment and system operating procedures, including the following:
 - a. Startup procedures.
 - b. Equipment or system break-in.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Instructions on stopping.
 - f. Shutdown and emergency instructions.
 - g. Summer and winter operating instructions.
 - h. Required sequences for electric or electronic systems.
 - i. Special operating instructions.
 5. Servicing Schedule: Provide a schedule of routine servicing and lubrication requirements, including a list of required lubricants for equipment with moving parts.
 6. Controls: Provide a description of the sequence of operation and as-installed control diagrams by the control manufacturer for systems requiring controls.
 7. Identification Drawings: Provide each Subcontractor's Identification Drawings.
 - a. Provide as-installed, color-coded, piping diagrams, where required for identification.
 8. Valve Tags: Provide charts of valve-tag numbers, with the location and function of each valve.
 9. Circuit Directories: For electric and electronic systems, provide complete circuit directories of panel boards, including the following:
 - a. Controls.
 - b. Communication.
- C. Electronic Media:**
1. For equipment which requires maintenance by operational personnel, provide a professionally developed DVD for the use of maintenance training for the facility. Each DVD will be accompanied by a written index which can be utilized to find any specific item of information by time or place on the DVD.
 2. The Construction Manager is responsible for this production. This DVD will be provided to the Owner's Representative at the same time as the delivery of the other maintenance material.
 3. The DVD must be able to be edited for future changes to the equipment and modifications as they occur.

1.8 COMMISSIONING RECORD AND TESTING DATA MANUAL

The Contractor shall cooperate with Commissioning Agent (CxA) in the preparation of a separate Manual dedicated to documenting the Commissioning process which will include all certifications and testing data and some repeating of O&M data. Description of this Manual is found in Section 01 91 00 Commissioning and shall be prepared by the Commissioning Agent (CxA).

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 78 23

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PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.
 - 1. Refer to the General Conditions for terms of the Contractor's period for correction of the Work.
- B. **Related Sections:** The following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section 01 33 00 "Submittal Procedures" specifies procedures for submitting warranties.
 - 2. Division 01 Section 01 77 00 "Closeout Procedures" specifies contract closeout procedures.
 - 3. Division 01 Section 01 78 23 "Operation and Maintenance Data" specifies required operation and maintenance data.
 - 4. Divisions 02 through 49 Sections for specific requirements for warranties on products and installations specified to be warranted.
 - 5. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.
- C. **Disclaimers and Limitations:** Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.3 WARRANTY REQUIREMENTS

- A. **Related Damages and Losses:** When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.
- B. **Reinstatement of Warranty:** When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. **Replacement Cost:** Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- D. **Owner's Recourse:** Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.
 - 1. **Rejection of Warranties:** The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
- E. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.
- F. The Contractor shall guarantee all materials and workmanship for a period of **eighteen (18)** months from the date of Substantial Completion of the Work. In addition, the Contractor shall furnish the warranties listed below. Submit four (4) copies of each to the Construction Administrator in the supplier's standard form or in the form given below if there is no standard form available.

- G. Specification/Warranty Table:** The General Contractor shall provide for all warranties as shown in the Specification/Warranty table. This list is not intended to be all inclusive and the General Contractor is responsible for all Warranties indicated in the Contract Documents, whether herein included or not.

| Item No. | Section No. | Specification Product/Warranty |
|----------|-------------|--|
| 1. | 055213 | Pipe and Tube Railings 20 years on galvanizing process 5 years on finish |
| 2. | 061200 | SIPs 20 years against delamination |
| 3. | 071416 | Cold Fluid-Applied Waterproofing 10 years materials and workmanship |
| 4. | 073116 | Metal Shingle Siding 15 years against structural failures, deterioration, water penetration and hail perforation 10 years for fluorocarbon finish against peeling, blistering, fading and chalking |
| 5. | 074113 | Standing Seam Metal Roofing: 2 years against rupture, cracks or perforation due to corrosion 20 years for fluorocarbon finish against peeling, blistering, fading and chalking as limited by industry standards 20 year weathertightness warranty by General Contractor's installer. |
| 6. | 074643 | Composite Siding and Trim 15 years against defects in materials and manufacturing |
| 7. | 075323 | Single-Ply Membrane Roofing, Base Flashing and Insulation: 20 year unlimited, materials and installation, the manufacturer's no dollar limit (NDL) warranty, and; 2 year General Contractor's warranty for installation. |
| 8. | 076200 | Sheet Metal Flashing and Trim 20 year on finish. |
| 9. | 077100 | Roof Specialties 20 years on finish |
| 10. | 079200 | Joint Sealants 2 year Installer's Warranty. 5 year Manufacturer's Warranty |
| 11. | 081416 | Wood Doors Lifetime of Installation. |
| 12. | 083323 | Overhead Coiling Doors 2 year, material and workmanship. |
| 13. | 083326 | Overhead Coiling Grilles 2 year, material and workmanship. |
| 14. | 084213 | Aluminum-Framed Entrances 5 year, material and workmanship. 20 years on finish |
| 15. | 085200 | Wood Windows: 10 Years material and workmanship 10 year glazing warranty against failure of hermetic seal, interpane dusting, or misting, including replacement of unit. |
| 16. | 087100 | Hardware: 3 year material and workmanship, except as noted below 5 Year, electronic locks 2 Exit devices 10 Closers |
| 17. | 088000 | Glazing 10 Years for all glazing products, including replacement of unit. |
| 18. | 089119 | Fixed Louvers: 10 Year on finish. |

| Item No. | Section | Specification/Product Warranty |
|----------|---------|---|
| 19. | 096813 | Tile Carpeting: 10 Material and workmanship |
| 20. | 101423 | Panel Signage 5 Years, material, and workmanship. |
| 21. | 101423 | Room Identification Panel Signage 5 years materials and workmanship. |
| 22. | 102239 | Folding Panel Partition 2 Years panel and finish. 5 Years, hardware |
| 23 | 102800 | Toilet Room Accessories 10 Mirrors, against visible silver spoilage 10 Materials and workmanship |
| 24 | 104416 | Fire Extinguishers 6 years, material, and installation. |
| 25 | 105113 | Metal Lockers 10 years, material, and installation. |
| 26 | 133419 | Metal Building Systems 20 Year finishes. 20 Year weathertightness |
| 27 | 142123 | Elevator: 18 months, manufacturer's warranty to the elevator contractor. |
| 28 | 220516 | Expansion Fittings and Loops for Plumbing Piping: 5 years, against leaks, |
| 29 | 220523 | General Duty Valves 5 years, material and installation, excluding packing |
| 30 | 220529 | Hangers and Supports for Plumbing 5 years, material and installation, |
| 31 | 220700 | Plumbing Insulation: 5 years, material and installation, |
| 32 | 221125 | Facility Gas Piping: 5 years, material and installation for valves, except packing, |
| 33 | 238146 | Water Source Unitary Heat Pumps: 4 Year extended warranty to a total of 5-years on compressor. 4 Year extended warranty to a total of 5-years on refrigeration circuit covering coils, reversing valves, expansion valves and compressor |
| 34 | 260923 | Lighting Control Devices 5 Years manufacturer's warranty for components |
| 35 | 264500 | Photovoltaic System 2 Years on labor and equipment for complete system 12 Years on string inverters 25 Years on Power Optimizer 20 Years on structurally connected racking system |
| 36 | 265200 | Emergency Lighting 5 Years on batteries on emergency lighting units 10 Years on batteries for self-powered exit lights 5 Years on LED driver emergency power supply units |
| 37 | 323300 | Site Furnishings 20 Year structural warranty on metal and galvanized components 3 Years against rusting, peeling, chipping, cracking and defects in materials and workmanship 7 Years against fading |

| Item No. | Section | Specification/Product Warranty |
|----------|---------|--|
| 38 | 329200 | Turf and Grasses |
| | | 2 Years on no mow / low mow coastal turf mix |
| | | 2 Years on Pollinator Mix |
| | | 2 Years on Conservation / Wildlife Mix |
| 39 | 329300 | Plants |
| | | 2 Years on Trees, shrubs, vines and ornamental grasses |
| | | 2 Years on Groundcover, biennials, perennials and other plants |
| 34 | 332313 | Geothermal Energy Exchange Wells |
| | | 50 Years manufacturer's warranty on piping and fittings |

- H. Submit certification that finish materials are fire rated as specified.
- I. Form of Warranty: Warranties shall be submitted in following format:

Warranty

Commissioner: Josh Geballe
Department of Administrative Services
DAS Commissioner's Office
450 Columbus Boulevard, Suite 1501
Hartford, CT 06103

Project Number: BI-T-615
Project Title: DEEP West District Headquarters

I (We) hereby warranty

the _____ work on the referenced project for a period of _____ years
from _____, 20 _____ against failures of workmanship and materials in accordance
with the requirements of Section _____, Page _____, Paragraph _____, of the Specifications.

Installer | Subcontractor | Vendor/Suppliers | Manufacturer

Installer or Subcontractor or Vendor/Suppliers or Manufacturer Name: _____

Installer or Subcontractor or Vendor/Suppliers or Manufacturer Signature: _____

General Contractor's Name _____

General Contractor's Signature: _____

or

General Contractor's Authorized Agent Signature: _____

- J. Bonds shall be by approved Surety Companies, made out to the Commissioner, Department of Administrative Services on companies' standard form.

- K. Warranties, Guarantees, or bonds supplied by the General Contractor's Subcontractors or Vendors/Suppliers or Manufacturers shall reference the project name, number, and location and be certified by the General Contractor to be for the product and installation on the project and must be countersigned by the General Contractor.
- L. Bonds shall be by approved Surety Companies, made out to the Commissioner, Department of Administrative Services, on company's standard form.
- M. Guarantees, warranties or bonds supplied by Subcontractors, Suppliers or Manufacturers shall reference the project name, number, and location and be certified by the Contractor to be for the product and installation on the project and must be countersigned by the Contractor.

1.4 SUBMITTALS

- A. Submit written warranties prior to the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.
- B. Forms for special warranties are included in this Section. Prepare a written document utilizing the appropriate form, ready for execution by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Submit a draft to the Owner, through the Construction Administrator, for approval prior to final execution.
 - 1. Refer to Divisions 02 through 49 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Form of Submittal: At Final Completion compile two (2) copies of each required warranty properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
- D. Bind warranties and bonds in heavy-duty, commercial-quality, durable 3-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - 1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address, and telephone number of the Installer.
 - 2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project title or name, and name of the Contractor.
 - 3. When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 01 78 30

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SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section 01 74 19 – Construction and Demolition Waste Management and Disposal
- C. Section 01 81 19 – Construction Indoor Air Quality Requirements
- D. LEED Reference Guide for Building Design and Construction (BD+C), version 4, U.S. Green Building Council
- E. LEED v4.1 Building Design and Construction (BD+C), Getting Started Guide for Beta Participants (Beta Guide), U.S. Green Building Council

1.2 DESCRIPTION OF WORK

- A. Section includes general, administrative, procedural, and product requirements for compliance with the prerequisites and credits of the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) for Building Design and Construction (BD+C), Version 4 Green Building Rating System for New Construction (NC) and select credits of the USGBC LEED for BD+C Version 4.1 Beta Rating System for New Construction (NC).
- B. Section includes the following appendices:
 - 1. APPENDIX A-018113 – VOC LIMITS
 - 2. APPENDIX B-018113 – LEED APPRAISAL
 - 3. APPENDIX C-018113 – LEED v4.1 MATERIALS REPORTING FORM
 - 4. APPENDIX D-018113 – LEED BOUNDARY
- C. The Owner has established that this Project shall achieve at a minimum LEED Platinum. LEED requirements outlined in this Section apply to all Work within the LEED Boundary provided in the Appendix of this Section.
- D. Several LEED prerequisites and credits needed to obtain LEED certification depend on product selections and may not be specifically identified as LEED requirements. Compliance with requirements needed to obtain LEED prerequisites and credits may be used as one criterion to evaluate substitution requests and comparable product requests.

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- E. Any discrepancies between the LEED Requirements outlined in this Section and those in other Sections require notification of the Architect and the Architect's approval of the resolution.
 - F. LEED Platinum goals and targeted credits are outlined in the LEED Appraisal appended at the end of this Section. The Contractor is responsible for LEED credits highlighted in yellow in the LEED Appraisal in the Appendix of this Section.
 - G. Note: For clarity, identification numbers have been added to LEED v4 and LEED v4.1 prerequisite and credit names as used throughout this Section.

1.3 SUSTAINABLE BUILDING REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED v4 Platinum Certification. Specific project goals that may impact this area of work include, but not limited to:
 - 1. Reduction of facility energy and water consumption.
 - 2. Reduction of exposure of occupants to potentially harmful pollutants.
 - 3. Reuse and recycling of construction materials.
 - 4. Construction air quality protection control.
 - 5. Construction water quality protection control.
 - 6. Sourcing of products from manufacturers that disclose information on material impacts, chemical content of products, and manufacturing practices.
 - 7. Sourcing of products that minimize negative environmental and human health impacts.
- B. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

1.4 REFERENCES

- A. Abbreviations and Acronyms:
 - 1. BD+C: Building Design + Construction
 - 2. BPDO: Building Product Disclosure + Optimization
 - 3. CARB: California Air Resources Board
 - 4. CDPH: California Department of Public Health
 - 5. CFC: Chlorofluorocarbons

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6. CGP: Construction General Permit
 7. CoC: Chain-of-Custody
 8. CSR: Corporate Sustainability Reports
 9. EA: Energy & Atmosphere
 10. EAct: Energy Policy Act
 11. EPD: Environmental Product Declaration
 12. EPR: Extended Producer Responsibility
 13. ESC: Erosion and Sedimentation Control
 14. EQ: Environmental Quality
 15. FSC: Forest Stewardship Council
 16. GBCI: Green Business Certification Inc.
 17. GRI: Global Reporting Initiative
 18. HPD: Health Product Declaration
 19. IN: Innovation in Design
 20. LCA: Life Cycle Assessments
 21. LEED: Leadership in Energy and Environmental Design
 22. LEM: Low-Emitting Materials
 23. MERV: Minimum Efficiency Reporting Value
 24. MR: Materials and Resources
 25. MSDS: Material Data Safety Sheet
 26. NAF: No Added Formaldehyde
 27. NC: New Construction
 28. PCB: Polychlorinated Biphenyls
 29. SANSA: Sustainable Agricultural Network's Sustainable Agricultural
 30. SCAQMD: South Coast Air Quality Management District
 31. SCM: Suggested Control Measure
 32. SR: Solar Reflectance
 33. SRI: Solar Reflectance Index
 34. SS: Sustainable Sites

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35. TVOC: Total Volatile Organic Compound
 36. ULEF: Ultra-Low-Emitting Formaldehyde
 37. USGBC: US Green Building Council
 38. VOC: Volatile Organic Compound
 39. WE: Water Efficiency

B. Reference Standards

1. ANSI/ASHRAE/IESNA 90.1-2010 – Energy Standard for Buildings Except Low-Rise Residential Buildings
2. ANSI/ASHRAE 52.2-2007 – Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size
3. ANSI/ASHRAE 62.1-2010 – Ventilation for Acceptable Indoor Air Quality
4. ANSI/ASTM-E779-10 – Determining Air Leakage Rate by Fan Pressurization
5. ASHRAE 52.2-2007 – Filtration Minimum Efficiency Reporting Value (MERV)
6. ASHRAE Guideline 0 – 2005, The Commissioning Process
7. ASHRAE Guideline 1.1-2007, HVAC&R Technical Requirements for the Commissioning Process
8. ASHRAE 55-2010 – Thermal Comfort Conditions for Human Occupancy
9. ASTM C1371-04 (R2010) – Determination of Emittance of Materials Near Room Temperature Using Portable Emitters
10. ASTM C1549-04 – Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer
11. ASTM D1003-11 – Haze and Luminous Transmittance of Transparent Plastics
12. ASTM E408-13 – Methods for Total Normal Emittances of Surfaces Using Inspection-Meter Techniques
13. ASTM E903-12 – Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres
14. ASTM E1903-11 – Phase II Environmental Site Assessment.
15. ASTM E1918-06 – Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field
16. ASTM E1980-11 – Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces

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17. ASTM/BIFMA Standard Method M7.1-2011 (R2016), Standard Test Method for Determining Emissions from Office Furniture Systems, Components and Seating – Furniture evaluation standard for VOC emissions
 18. ATSM/BIFMA e3-2014e Furniture Sustainability Standard Section 7.6.1 and 7.6.2 – VOC emission limits for office furniture, components and seating
 19. California Air Resources Board (CARB) Airborne Toxic Measure to Reduce Formaldehyde Emissions from Composite Wood Products Regulation
 20. CARB Suggested Control Measure for Architectural Coatings, 2007
 21. California Title 24-2013, Part 6 – Building Energy Efficiency Standards
 22. California Dept. of Public Health Standard Method v1.2-2017, Standard Method for The Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers
 23. (The) Carbon Trust – Good Practice Guide (GPG) 237, Natural Ventilation in Non-Domestic Buildings, A Guide for Designers, Developers, and Owners, 1998
 24. CIBSE – Chartered Institute of Building Services Engineers Applications Manual 10, Natural Ventilation in Non-Domestic Buildings, 2005
 25. CRI – Carpet and Rug Institute Green Label and Green Label Plus Testing Program
 26. IgCC/ASHRAE 189.1 – Cooling Tower & Evaporative Condenser Requirements
 27. EN 717-1: 2014 Wood-based Panels – Determination of Formaldehyde Release – Formaldehyde Emission by the Chamber Method
 28. EN 15804 – Sustainability of Construction Works, Environmental Product Declarations, Core Rules for the Product Category of Construction Products
 29. EPA ENERGY STAR – Qualified Products
 30. EPA Construction General Permit (CGP): 2012
 31. EPA – Brownfields Definition – Sustainable Redevelopment of Brownfields Program
 32. EPA Clean Air Act, Title VI, Section 608, Compliance with the Section 608 Refrigerant Recycling Rule
 33. EPA – Energy Policy Act (EPAct) of 1992 (and as amended), Fixture Flow Requirements
 34. EPA – Energy Policy Act (EPAct) of 2005, Fixture Flow Requirements
 35. EPA – Energy Star Roofing Guidelines
 36. EPA 832-R-92-005 – Storm Water Management for Construction Activities, Chapter 3
 37. EPA 840-B-92-002, Jan 1993 – Guidance Specifying Management Measures for Sources of Non-Point Pollution in Coastal Waters

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38. EPA PB90200288 – Compendium of Methods for the Determination of Air Pollutants in Indoor Air
 39. EPA 763-E-C-40-CFR Asbestos Remediation Testing
 40. EPA TSCA Title VI – The Formaldehyde Standards for Composite Wood Products
 41. FEMA – 100-Year Flood Definition
 42. FSC – Forest Stewardship Council’s Principles and Criteria
 43. Greenguard Certification Program – Greenguard Environmental Institute
 44. IAPMO/ ANSI UPC 1-2006 – Uniform Plumbing Code 2006 Section 402.0 Water-Conserving Fixtures and fittings, effective 2006
 45. ICC – International Plumbing Code 2006, Section 604, Design of Building Water Distribution System, effective 2006
 46. ISO 14025 – Environmental Labels and Declarations – Type III Environmental Declarations – Principles and Procedures
 47. ISO 14044 – Environmental Management – Life Cycle Assessment – Requirements and Guidelines
 48. ISO 14071 – Environmental Management – Life Cycle Assessment – Critical Review Processes and Reviewer Competencies: Additional Requirements and Guidelines to ISO 14044: 2006
 49. ISO 21930 – Sustainability in Buildings and Civil Engineering Works – Core Rules for Environmental Product Declarations of Construction Products and Services
 50. South Coast Air Quality Management District (SCAQMD) Rule #1113 – VOC Limits for Architectural Coatings, effective February 5, 2016
 51. SCAQMD Amendment to South Coast Rule #1168 – VOC Limits for Adhesives, Sealant and Sealant Primers, effective October 6, 2017
 52. SMACNA/ANSI 008-2008 – IAQ Guidelines for Occupied Buildings Under Construction, 2nd Edition 2007
 53. USGBC – LEED Version 4 BD+C Reference Guide
 54. USGBC – LEED v4.1 BD+C Beta Guide

C. Definitions

1. Brownfield: U.S. EPA Definition of Brownfields – With certain legal exclusions and additions, brownfield site means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.

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2. Chain-of-Custody (CoC): A tracking procedure to document the status of a wood product from the point of harvest or extraction to the ultimate end use. A “vendor” is defined as the company that supplies wood products to project contractors or subcontractors for on-site installation.
 3. Chain-of-custody certification: Awarded to companies that produce, sell, promote, or trade forest products after audits verify proper accounting of material flows and proper use of the Forest Stewardship Council name and logo. The CoC certificate number is listed on invoices for non-labeled products to document that an entity has followed FSC guidelines for product accounting.
 4. Chlorofluorocarbons (CFCs): Hydrocarbons that deplete the stratospheric ozone layer.
 5. Composite wood: Consists of wood or plant particles or fibers bonded by a synthetic resin or binder. Examples include particleboard, medium-density fiberboard (MDF), plywood, oriented-strand board (OSB), wheatboard, strawboard, and structural composite wood.
 6. Environmental Product Declaration (EPD): A statement that the product meets the environmental requirements of ISO 14025, and EN 15804 or ISO 21930.
 7. Extended Producer Responsibility (EPR): Program implemented by a product manufacturer to accept its own and sometimes other manufacturers’ products as postconsumer waste at the end of the products’ useful life. Alternatively known as a manufacturer's take-back program.
 8. Forest Stewardship Council (FSC): An independent, non-governmental, not for profit organization established to promote the responsible management of the world's forests. FSC provides certifications to award forest managers who adopt environmentally and socially responsible forest management practices and to companies that manufacture and sell products that directly support responsible forest management.
 9. Formaldehyde Emissions Evaluation: Evaluation demonstrating that the product meets one of the following:
 - a. EPA TSCA Title VI or California Air Resources Board (CARB) ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins.
 - b. EPA TSCA Title VI or CARB ATCM formaldehyde requirements for no added formaldehyde resins (NAF).
 - c. Tested per EN 717-1:2014 for formaldehyde emissions and complies with emissions class E1.
 - d. Structural composite wood product made with moisture resistant adhesives meeting ASTM 2559, no surface treatments with added urea-formaldehyde resins or coatings, and certified according to one of the industry standards as described in the LEED v4.1 BD+C Beta Guide.
 10. Health Product Declaration (HPD): Products with a published and complete HPD with full disclosure of known hazards and residuals disclosure at no less stringent than 1,000 parts

per millions (ppm), in compliance with the Health Product Declaration Open Standard as maintained by the Health Product Declaration Collaborative (www.hpd-collaborative.org).

11. Hydrochlorofluorocarbons (HCFCs): Refrigerants used in building equipment that deplete the stratospheric ozone layer, but to a lesser extent than CFCs.
12. Inherently Non-emitting Materials: Naturally occurring materials and products made from inorganic materials that emit either very low or no VOCs. Products that are inherently nonemitting sources of VOCs (stone, ceramic, powder-coated metals, plated or anodized metal, glass, concrete, clay brick, and unfinished or untreated solid wood flooring) are considered fully compliant with the Low-Emitting Materials credit without any VOC emissions testing, if they do not include integral organic based surface coatings, binders, or sealants.
13. Life Cycle Assessment (LCA): An evaluation of the environmental effects of a product from cradle (resource extraction) to grave (product disposal), as defined by ISO 14040–2006 and ISO 14044–2006.
14. Low-Emitting Materials (LEM) Product Categories: flooring; composite wood; ceilings; wall panels; insulation; field-applied adhesives and sealants; field-applied paints and coatings; and furniture products.
15. Material Cost: For the purposes of LEED calculations and tracking, the dollar value of a product furnished for the Project including the cost of materials, shop labor, Contractor markups, taxes, fees, delivery costs, and all expenses incurred by the Contractor to bring the product to the Project site. Material cost excludes any cost for site labor and site equipment required for installation on the Project site.
16. Point of Harvest/Extraction/Recovery: Location where raw material is gathered for use in production.
17. Point of Manufacturing: Location where individual components are assembled into a product that is furnished and installed on site.
18. Point of Purchase: Location of the purchase transaction for a product. For online or other transactions that do not occur in person, the point of purchase is considered the location of product distribution.
19. Pre-Consumer Recycled Content: Defined as material diverted from the waste stream during the manufacturing process. Examples in this category include planer shavings, plytrim, sawdust, chips, bagasse, sunflower seed hulls, walnut shells, culls, trimmed materials, print overruns, over-issue publications, and obsolete inventories. Excluded is reutilization of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it. (Previously referred to as Post-industrial Content.)
20. Post-Consumer Waste: Waste material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for its intended purpose. This includes returns of materials from the distribution chain. Examples of this category include construction and demolition debris,

materials collected through curbside and drop-off recycling programs, broken pallets, discarded products (e.g., furniture, cabinetry and decking) and urban maintenance waste (e.g., leaves, grass clippings, tree trimmings, etc.).

21. Solar Reflectance (SR): the fraction of solar energy that is reflected by a surface on a scale of 0 to 1. It is defined so that a standard black has a solar reflectance of 0 and a standard white has a solar reflectance of 1.
22. Solar Reflectance Index (SRI): A measure of a material's ability to reject solar heat, as shown by a small temperature rise. It is defined so that a standard black (reflectance 0.05, emittance 0.9) has a SRI of 0, and a standard white (reflectance 0.80, emittance 0.90) has a SRI of 100.
23. Vendor: A Vendor of certified wood is the organization that sells/supplies wood products to contractors or subcontractors. A vendor must have a FSC Chain of Custody (CoC) certificate if it is selling FSC-certified products for which its packaging or form will be modified and/or products that are not individually labeled; this includes most lumber.
24. Volatile Organic Compounds (VOCs): Carbon-containing compounds that participate in atmospheric photochemical reactions (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonates, and ammonium carbonate). The compounds vaporize (become a gas) at normal room temperatures.
25. VOC Emissions Evaluation: Evaluation demonstrating that the product has been tested according to California Department of Public Health (CDPH) Standard Method v1.2-2017 and complies with the VOC limits in Table 4-1 of the method. Additionally, the range of total VOCs after 14 days (336 hours) was measured as specified in the CDPH Standard Method v1.2 and is reported (TVOC ranges: 0.5 mg/m³ or less, between 0.5 and 5 mg/m³, or 5 mg/m³ or more). Laboratories that conduct the tests must be accredited under ISO/IEC 17025 for the test methods they use. Products used in school classrooms must be evaluated using the classroom scenario, products used in other spaces must be evaluated using the default private office scenario. The statement of product compliance must include the exposure scenario(s) used, the amount of wet-applied product applied in mass per surface area (if applicable), the range of total VOCs, and follow guidelines in CDPH Standard Method v1.2-2017, Section 8. Organizations that certify manufacturers' claims must be accredited under ISO Guide 17065.
26. Total Volatile Organic Compounds (TVOCs): Sum of the concentrations of all identified and unidentified VOCs between and including n-pentane through n-heptadecane (i.e., C₅ - C₁₇) as measured by the gas chromatography/mass spectrometry (GC/MS) total ion-current chromatogram (TIC) method and expressed as a toluene equivalent value.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Respond to questions and requests from Architect and Sustainability/LEED Consultant regarding LEED credits that are the responsibility of the Contractor, that depend on product selection or product qualities, or that depend on Contractor's procedures until the GBCI has made its final

determination on the project's LEED certification application. Document responses as informational submittals.

1.6 SUBMITTALS

A. General Requirements:

1. Submit additional LEED submittals required by other Specification Sections.

B. LEED Product Submittals

1. Projects seeking LEED certification must track and record product, material, and cost information for LEED credit documentation. The contractor shall complete and submit the LEED v4 Materials Reporting Form with product submittals for the following:
 - a. All permanently installed products and materials related to the work of any Section installed on the interior of the building (i.e. inside the weatherproofing membrane) and falling within one of the applicable LEM Product Categories.
 - b. All permanently installed products and materials specified in CSI MasterFormat 2012 Edition Divisions 03-12, 31 (Sections relating to Foundations), and 32 (Sections relating to Pavings, Site Improvements, and Planting).
2. For each building product and material listed on the Materials Reporting Form, provide information and support documentation for the product as defined in this Section to support all environmental claims listed in the Materials Reporting Form. Submittal requirements for the support documentation can be found in the "LEED Credit-Specific Submittal" paragraph of this Section.
3. A sample Materials Reporting Form for this project has been included in the Appendix of this Section.

C. LEED Credit-Specific Submittals

1. General

- a. For detailed explanation of credit requirements, refer to LEED v4 BD+C Reference Guide and LEED v4.1 BD+C Beta Guide.
- b. For MR Credits 2, 3, and 4 - Building Product Disclosure and Optimization (BPDO) listed below:
 - 1) Submittals apply to permanently installed products and materials specified in CSI MasterFormat 2012 Edition Divisions 3-12, 31 (Sections relating to Foundations), and 32 (Sections relating to Pavings, Site Improvements, and Planting).

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- 2) Submit the following for any regionally sourced products that have raw materials extracted, are manufactured (including distribution), and are purchased within 100 miles of the Project site, provide cut sheet or a written affidavit from the manufacturer indicating:
 - a) The Point of Purchase (location of purchase transaction). If purchased online or not in-person, Point of Purchase is considered the location of product distribution.
 - b) Breakdown of product component materials which are extracted, manufactured, and purchased within 100 miles of the project site and the material percentage of each component by weight.
 - c) The distance in miles from the Points of raw material extraction, product manufacturing, and purchasing/distribution to the Project site location, measured as the most direct route between points.
 - c. For EQ Credit 2 - Low-Emitting Materials, submittals apply to permanently installed products and materials related to the work of any Section on the interior of the building (i.e. inside the weatherproofing membrane) and falling within one of the applicable LEM Product Categories.
2. MR Credit 2 - BPDO – Environmental Product Declarations (EPD): submit the following documentation, as described in the LEED v4.1 BD+C Beta Guide.
- a. Credit Option 1 (EPD): submit at least one of the following for each applicable product:
 - 1) Life-cycle assessment: manufacturer’s publicly available, critically reviewed product-specific life-cycle assessment (LCA) conforming to ISO 14044 and that has at least a cradle to gate scope.
 - 2) Product-specific Type III EPD – Internally Reviewed: manufacturer’s internally reviewed product-specific LCA in accordance with ISO 14071, and product-specific internal EPD conforming to ISO 14025, and EN 15804 or ISO 21930 and that has at least a cradle to gate scope.
 - 3) Industry-wide Type III EPD – Externally Reviewed: externally reviewed industry-wide Type III EPD conforming to ISO 14025, and EN 15804 or ISO 21930 and that has at least a cradle to gate scope and recognizes the manufacturer as a participant by the program operator.
 - 4) Product-specific Type III EPD – Externally Reviewed: externally reviewed product-specific Type III EPD conforming to ISO 14025 and EN 15804 or ISO 21930 and that has at least a cradle to gate scope.
 - b. Credit Option 2 (Multi-Attribute Optimization): submit at least one of the following for each applicable product:

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- 1) Life Cycle Impact Reduction Action Plan: manufacturer's publicly available plan to mitigate or reduce product life cycle impacts identified in product-specific LCA using EN 15804 or ISO 21930.
 - 2) Life Cycle Impact Reductions in Embodied Carbon Comparative Analysis: two iterations of the manufacturer's third-party verified LCA or EPD (for the same product or product type) in accordance with MR Credit 2 Option 1 requirements above, and manufacturer's publicly available narrative, demonstrating the required environmental impact reductions in global warming potential.
3. MR Credit 3 - BPDO – Sourcing of Raw Materials: submit the following documentation as described in the LEED v4.1 BD+C Beta Guide, as applicable.
- a. For products purchased from a manufacturer (producer) that participates in an extended producer responsibility (i.e., take-back) program, provide company brochure or similar describing the program, including contact information and verification that the product is included in the program.
 - b. For products containing bio-based materials, provide documentation from the raw-material manufacturer stating conformance to testing per ASTM Method D6866 and legal harvesting, as defined by the exporting and receiving country. If available, provide documentation from the raw-material manufacturer stating conformance to the Sustainable Agricultural Network's Sustainable Agricultural (SANSAs) Standard in the form of a signed letter on company letterhead.
 - c. For products that are salvaged, refurbished, or reused, provide statement of source of materials, including statement of costs. The cost of reused or reclaimed materials is either the actual cost paid or the replacement value, whichever is higher. Replacement cost is determined by pricing comparable materials in the local market, excluding labor and shipping, and shall reflect any price discounts if applicable.
 - d. For products containing recycled content, provide product cut sheet or a written affidavit on company letterhead (email is not acceptable) from the manufacturer indicating the percentages, by material weight, of post-consumer and pre-consumer recycled content.
 - e. For permanently installed non-recycled wood and wood-based material, submit the following:
 - 1) Forest Stewardship Council's Chain of Custody (CoC) Certification Number for each installed certified wood product, declaring conformance with FSC Guidelines for certified wood. CoC numbers shall be obtained from the manufacturer and must be itemized on a line-item basis. When applicable, a CoC number is required by the source forest, transportation entity, supplier/manufacturer, and vendors of the material.
 - 2) Vendor invoices, including all FSC-certified and non FSC-certified wood products purchased. Vendors are defined as those companies that sell

products to the project contractor or subcontractors for installation on the Project site. Invoices must include:

- a) Itemization of each wood product identified as such on a line item basis.
 - b) FSC products identified as such on a line-item basis and must be identified as “FSC Pure, FSC Mixed Credit”, or “FSC Mixed [NN] %”.
 - c) The dollar value of each line item.
 - d) iv. The vendor’s chain-of-custody (CoC) number must be shown on any invoice that includes FSC products.
 - e) If it is impractical for a vendor to invoice wood products on a line-item basis because the invoice would be excessive in length, the invoice should indicate the aggregate value of wood products sold by the vendor.
4. MR Credit 4 - BPDO – Material Ingredients: submit the following documentation, as described in the LEED v4.1 BD+C Beta Guide.
- a. Credit Option 1 (Material Ingredient Reporting): Submit at least one of the following demonstrating a chemical inventory of the product to at least 0.1% (1000 ppm) for each applicable product:
 - 1) Manufacturer's publicly available ingredient inventory
 - 2) Health Product Declaration (HPD)
 - 3) Cradle to Cradle Material Health Certificate
 - 4) Cradle to Cradle certificate (minimum v3 with Material Health achievement level at the Bronze level or higher)
 - 5) Declare product label
 - 6) ANSI/BIFMA e3 Furniture Sustainability Standard
 - 7) UL Product Lens certificate
 - 8) Facts – NSF/ANSI 336: Sustainability Assessment for Commercial Furnishings Fabric
 - b. Credit Option 2 (Material Ingredient Optimization): Submit at least one of the following for each applicable product:
 - 1) Material ingredient screening and optimization action plan for optimizing chemical inventory reported under MR Credit 4 Option 1.
 - 2) Third-party verified manufacturer’s publicly available ingredient inventory or HPD demonstrating the product’s chemical inventory to at least 0.01% (100 ppm), showing compliance with at least one of the following:

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- a) No GreenScreen LT-1 hazards or GHS Category 1 hazards.
 - b) At least 75% by weight of the product is assessed using GreenScreen Benchmark assessment, with the remaining percentage inventoried.
 - 3) Third-party verified Declare label designated as Red List Free.
 - 4) Cradle to Cradle Material Health Certificate
 - 5) Cradle to Cradle certificate (minimum v3 with Material Health Achievement level at the Silver level or higher)
5. EQ Credit 2 - Low-Emitting Materials: submit the following documentation, as applicable and as described in the LEED v4.1 BD+C Beta Guide.
- a. For composite wood products, including but not limited to particleboard, medium density fiberboard, plywood, and structural composite wood, submit a cut sheet, approved third-party certification, test report, or written affidavit from the manufacturer demonstrating compliance with Formaldehyde Emissions Evaluation, as defined in this Section.
 - b. For interior flooring products, including but not limited to carpet, resilient flooring, engineered wood, and mineral-based tile, submit a cut sheet, approved third-party certification, test report, or written affidavit from the manufacturer demonstrating compliance with VOC Emissions Evaluation or inherently non-emitting sources criteria for each installed product or system.
 - c. For wet-applied, field-installed interior products including adhesives, sealants, paints, and coatings, submit the following:
 - 1) Material Data Safety Sheet (MSDS) or product data sheets highlighting VOC content measured in grams per liter (g/L) less water and exempt solvents.
 - 2) A cut sheet, approved third-party certification, test report, or written affidavit from the manufacturer demonstrating compliance with VOC Emissions Evaluation.
 - d. For interior ceiling assemblies, including but not limited to ceiling panels, ceiling tile, surface ceiling structures such as gypsum or plaster, suspended systems (including canopies and clouds), and glazed skylights, submit a cut sheet, approved third-party certification, test report, or written affidavit from the manufacturer demonstrating compliance with VOC Emissions Evaluation or inherently non-emitting sources criteria for each installed product or system.
 - e. For wall panels, including but not limited to finish wall treatments, surface wall structures such as gypsum or plaster, cubicle/curtain/partition walls, trim, doors, frames, windows, and window treatments, submit a cut sheet, approved third-party certification, test report, or written affidavit from the manufacturer demonstrating compliance with VOC Emissions Evaluation or inherently non-emitting sources criteria for each installed product or system.

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- f. For insulation, including but not limited to thermal and acoustic boards, batts, rolls, blankets, sound attention fire blankets, foamed-in place, loose-fill, blown, and sprayed insulation, submit a cut sheet, approved third-party certification, test report, or written affidavit from the manufacturer demonstrating compliance with VOC Emissions Evaluation for each installed product or system.
6. SS Credit 5 - Heat Island Reduction: submit the following documentation:
 - a. For roofing materials, submit cut sheets indicating three-year aged Solar Reflectance Index (SRI) values. Initial SRI values are acceptable only if three-year aged SRI values are not available.
 - b. For hardscape materials, submit cut sheets indicating three-year aged Solar Reflectance (SR) values. Initial SR values are acceptable only if three-year aged SRI values are not available.
 7. WE Prerequisite 2 and Credit 2 - Indoor Water Use Reduction: for plumbing fixtures, submit cut sheets with water consumption flow or flush rates highlighted.
 8. WE Prerequisite 1 and Credit 1 - Outdoor Water Use Reduction: submit cut sheets for components of the landscape irrigation system (if applicable) indicating water saving efficiency.
 9. EQ Credit 3 - Construction Indoor Air Quality Management Plan: For submittal requirements, refer to Section 018119 - Construction Indoor Air Quality Requirements.
 10. EQ Credit 4 – Indoor Air Quality Assessment: For submittal requirements, refer to Section 018119 - Construction Indoor Air Quality Requirements.
 11. MR Prerequisite 2 - Construction and Demolition Waste Management Planning: For submittal requirements, refer to Section 017419 - Construction and Demolition Waste Management and Disposal.
 12. MR Credit 5 - Construction and Demolition Waste Management: For submittal requirements, refer to Section 017419 - Construction and Demolition Waste Management and Disposal.
 13. SS Prerequisite 1 - Construction Activity Pollution Prevention: The Contractor shall implement and document the Project Erosion and Sedimentation Control (ESC) Plan for construction activities associated with the project.
 - a. The documentation shall consist of one or more of the following measures, as determined by the Owner and Architect.
 - 1) The Contractor shall declare the occurrence of periodic inspections throughout the construction process and provide documentation and reporting that the Erosion and Sedimentation Control Plan was executed appropriately. The documentation must include the following:
 - a) Documentation of sample dates.
 - b) Inspection frequency, which shall occur a minimum of once per month.

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- c) Minimum of three (3) inspections equally spaced over the duration of site work.
 - d) Detailed descriptions of corrective actions taken.
- 2) The Contractor shall provide date-stamped photos which shall document the implemented measures prescribed by the Erosion and Sedimentation Control Plan and document corrective actions taken during construction.
 - 3) The Contractor shall provide a narrative describing the measures taken to implement the Erosion and Sedimentation Control Plan.

D. LEED Materials Tracking Submittals

- 1. The Contractor shall complete a LEED v4.1 Building Product Disclosure + Optimization (BPDO) Calculator for products in CSI MasterFormat 2012 Edition Divisions 03-12, 31 (Sections relating to Foundations), and 32 (Sections relating to Paving, Site Improvements, and Planting) according to the following schedule and requirements:
 - a. The LEED v4.1 BPDO Calculator is available for download at <https://www.usgbc.org/resources/leed-v41-bpdo-calculator>.
 - b. At the commencement of construction, submit a BPDO Calculator with preliminary materials cost information and the anticipated submittal log.
 - c. On a monthly basis during construction, update and submit the BPDO Calculator with actual product data and cost information from approved LEED Product Submittals.
 - d. At substantial completion, submit a final and complete BPDO Calculator with required product data and cost data.
- 2. The Contractor shall complete a LEED v4.1 Low-Emitting Materials Calculator for permanently installed interior products related to the work of any Section, for the applicable LEM Product Categories.
 - a. The LEED v4.1 Low-Emitting Materials Calculator is available for download at <https://www.usgbc.org/resources/leed-v41-lowemitting-materials-calculator>.
 - b. On a monthly basis during construction, update and submit the Low-Emitting Materials Calculator with actual product data from approved LEED Product Submittals
 - c. At substantial completion, submit a final and complete Low-Emitting Materials Calculator with required product data.

E. LEED Submission Documentation:

- 1. At or before substantial completion, the Contractor shall prepare supporting documentation for each LEED construction prerequisite and credit to be attempted, which have been assigned to the Contractor by the Owner or Architect.

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- a. Sustainability/LEED Consultant shall prepare and distribute a LEED v4/4.1 Documentation Matrix to the Contractor. The LEED v4/4.1 Documentation Matrix illustrates the deliverables required to adequately record that the project has met the intent of each credit.
 - b. Contractor shall register and log-in to LEED Online (<http://www.leedonline.com>).
 - c. Contractor shall complete LEED Online credit forms and upload associated required backup documentation for all the credits assigned in LEED v4/4.1 Documentation Matrix.
 - 1) The LEED Online credit forms shall contain all proper data fields completed declaring that the project has met the intent of the credit, including narrative(s) when applicable. Provide electronic signature of Contractor and date signed, where required.
 - 2) For credits requiring product data, compile all LEED product data into one package per credit. Irrelevant product data shall be excluded from the backup documentation.
 - d. The contractor shall notify sustainability/LEED Consultant of completion of LEED Online documentation and availability for review and coordinate with sustainability/LEED Consultant for preparation of final documentation of LEED submission.

1.7 QUALITY ASSURANCE

- A. The Contractor shall retain a dedicated Sustainability Representative to oversee all on-site activities related to compliance with LEED criteria. The Sustainability Representative shall, at minimum:
 1. Be a LEED Green Associate.
 2. Be assigned to manage on-site construction administration of the Project's Sustainable Design Requirements, including but not limited to, Erosion and Sedimentation Control, Construction and Demolition Waste Management, indoor air quality, and material tracking.
 3. Take primary responsibility for managing the process of implementing and documenting the construction-related LEED prerequisites and credits for which the Contractor will be responsible, including collecting, organizing, and uploading the documentation required for the Project's LEED submission to LEED Online.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Provide products and procedures necessary to obtain LEED credits required in this Section. Although other Sections may specify some requirements that contribute to LEED credits, the Contractor shall determine additional materials and procedures necessary to obtain LEED credits indicated.
- B. LEED Performance Criteria: Products and Materials shall meet the following project-wide criteria as well as applicable product-specific criteria in Part 2 of this Section.
1. MR Credit 2 - BPDO - EPD, Option 1 (EPD):
 - a. Install at least twenty (20) different permanently installed products sourced from at least five (5) different manufacturers that meet criteria described in the LEED v4.1 BD+C Beta Guide.
 2. MR Credit 2 - BPDO - EPD, Option 2 (Multi-Attribute Optimization):
 - a. Use products that comply with credit criteria described in the LEED v4.1 BD+C Beta Guide for at least 10%, by cost, of the total value of permanently installed products in the Project, or use at least ten (10) different permanently installed products sourced from at least three (3) different manufacturers that meet credit criteria described in the LEED v4.1 BD+C Beta Guide.
 3. MR Credit 3 - BPDO - Sourcing of Raw Materials:
 - a. Install products that meet at least one (1) of the responsible extraction criterion described in the LEED v4.1 BD+C Beta Guide and in aggregate comprise at least 20 percent, by cost, of the total value of permanently installed building products in the Project.
 4. MR Credit 4 - BPDO - Material Ingredients, Option 1 (Material Ingredient Reporting):
 - a. Install at least twenty (20) different permanently installed products sourced from at least five (5) different manufacturers that meet criteria described in the LEED v4.1 BD+C Beta Guide.
 5. MR Credit 4 - BPDO - Material Ingredients, Option 2 (Material Ingredient Optimization):
 - a. Use permanently installed products from at least three (3) different manufacturers that document their material ingredient optimization in accordance with criteria described in the LEED v4.1 BD+C Beta Guide for at least ten (10) different permanently installed products or for products that constitute at least 10%, by cost, of the total value of permanently installed products in the Project.
 6. EQ Credit 2 - Low-Emitting Materials: Install interior products that meet overall Project compliance levels, as listed below and described in the LEED v4.1 BD+C Beta Guide.

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- a. Wet-applied interior adhesives and sealants applied on site:
 - 1) 100 percent compliance for VOC Content Evaluation for adhesives and sealants.
 - 2) Minimum 75 percent compliance (by volume or surface area) for VOC Emissions Evaluation.
 - b. Wet-applied interior paints and architectural coatings applied on site:
 - 1) 100 percent compliance for VOC Content Evaluation for paints and coatings.
 - 2) Minimum 75 percent compliance (by volume or surface area) for VOC Emissions Evaluation.
 - c. Interior flooring products: minimum 90 percent compliance (by cost or surface area) for VOC Emissions Evaluation or inherently non-emitting sources criteria.
 - d. Interior composite wood products: minimum 75 percent compliance (by cost or surface area) for Formaldehyde Emissions Evaluation.
 - e. Interior ceiling assemblies: minimum 90 percent compliance (by cost or surface area) for VOC Emissions Evaluation or inherently non-emitting sources criteria.
 - f. Interior wall panels: minimum 75 percent compliance (by cost or surface area) for VOC Emissions Evaluation or inherently non-emitting sources criteria.
 - g. Interior insulation: minimum 75 percent compliance for VOC emissions evaluation.

2.2 ADHESIVES AND SEALANTS

- A. Wet-applied adhesives and sealants installed in the building interior (i.e. inside of the weatherproofing membrane) must comply with the following:
 - 1. VOC Emissions Evaluation, as defined in this Section.
 - 2. VOC Content Evaluation for adhesives and sealants, as defined below:
 - a. Methylene chloride (CAS # 75-09-2) and perchloroethylene (CAS # 127-18-4) may not be intentionally added ingredients.
 - b. Chemical content requirements and maximum VOC content limits established by SCAQMD Rule #1168, October 6, 2017 Amendment and listed in the Appendix of this Section.
 - 1) VOC limits are defined in grams per liter, less water and less exempt compounds unless otherwise noted.
 - 2) VOC contents are determined by the methods of EPA Reference Test Method 24.

2.3 PAINTS AND COATINGS

- A. Wet-applied paints and coatings installed in the building interior (i.e. inside of the weatherproofing membrane) must comply with the following:
1. VOC Emissions Evaluation, as defined in this Section.
 2. VOC Content Evaluation for paints and coatings, as defined below:
 - a. Methylene chloride (CAS # 75-09-2) and perchloroethylene (CAS # 127-18-4) may not be intentionally added ingredients.
 - b. Maximum VOC content limits established by California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule #1113, February 5, 2016 Amendment and listed in the Appendix of this Section.
 - 1) VOC limits are defined in grams per liter, less water and less exempt compounds unless otherwise noted.
 - 2) VOC contents are determined by the methods of EPA Reference Test Method 24.

2.4 FLOORING SYSTEMS

- A. Carpet systems or assemblies: must meet VOC Emissions Evaluation requirements as defined in this Section.
1. Carpet adhesives must meet the product requirements for Adhesives, as defined in this Section.
- B. Hard and soft surface flooring, wall base, underlayments, and other floor coverings:
1. Flooring products must meet VOC Emissions Evaluation requirements, as defined in this Section. Products which qualify as Inherently Non-emitting Material, as defined in this Section, are exempt from this requirement.
 2. Associated site-applied adhesives, grouts, epoxies, mortars, finishes and sealers must meet applicable requirements for Adhesives, Sealants, or Coatings, as defined in this Section.
- C. Site-applied concrete, wood, bamboo and cork floor finishes such as sealer, stain and finish: must meet applicable requirements for Adhesives, Sealants, or Coatings, as defined in this Section.
- D. Tile setting adhesives and grout: must meet applicable requirements for Adhesives, Sealants, or Coatings, as defined in this Section.

2.5 CEILING SYSTEMS

- A. Ceiling systems such as ceiling panels, ceiling tile, surface ceiling structures such as gypsum or plaster, suspended systems (including canopies and clouds), and glazed skylights, must meet VOC Emissions Evaluation requirements as defined in this Section.

2.6 WALL PANELS

- A. Wall panels such as finish wall treatments (wall coverings, wall paneling, wall tile), surface wall structures such as gypsum or plaster, cubicle/curtain/partition walls, trim, doors, frame, windows, and window treatments, must meet VOC Emissions Evaluation requirements as defined in this Section.

2.7 INSULATION

- A. Insulation such as thermal and acoustic boards, batts, rolls, blankets, sound attention fire blankets, foamed-in place, loose-fill and sprayed insulation must meet VOC Emissions Evaluation requirements as defined in this Section.

2.8 WOOD AND WOOD PRODUCTS

- A. New, non-recycled wood and wood-based materials shall be certified in accordance with Forest Stewardship Council (FSC) Guidelines. This includes wood permanently installed in the project but is not limited to structural framing and dimensional lumber, blocking, flooring, finished woodwork, millwork, casework, and non-rented temporary construction applications including bracing, concrete form work, and pedestrian barriers.
- B. No partial claims shall be made for products that contain FSC certified wood but are not sold with a FSC claim. A product that contains a mix of FSC-certified components with non-certified components is not considered a FSC Mixed product in an assembly and is not eligible to receive credit for the certified portion. The product shall only contribute to the MR LEED credit if the product complies with FSC Chain-of-Custody rules for Mixed products and the invoice carries a valid FSC claim and chain of custody number.
- C. Contractors and subcontractors that temporarily possess FSC-certified material prior to installation shall not mix FSC-certified material with non-FSC-certified material.
- D. Chain of Custody (CoC) Requirements:
 - 1. Transportation entities shall require a CoC when the transport to the next entity involves a change of ownership of the material or product. Shippers or transport companies handling goods owned by FSC CoC certified companies are exempt.
 - 2. Each wood products supplier and/or manufacturer that invoices FSC-certified wood products to a vendor must be certified by an FSC-accredited certifier.

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3. Each wood products vendor that invoices FSC-certified wood products to product contractors and subcontractors must be certified by an FSC-accredited certifier.
 4. Parties that manufacture FSC-certified wood products off-site and then install them on-site must be FSC CoC certified for the products to contribute to LEED credit MRc7. This includes, but is not limited to, cabinetmakers and architectural millworkers.
 5. Parties that do not manufacture, but install an FSC-certified product on the project site, do not require FSC Chain of Custody certification as long as they do not modify the product packaging or form except for the purposes of installation. This includes, but is not limited to, contractors, subcontractors, and furniture installers.
 6. If a manufacturer places its FSC CoC label on product packaging used for individual sale (generally applying to fabricated products), then subsequent entities in the supply chain are not required to have CoC certification unless the product's packaging or form is changed before it reaches the end consumer.
 7. For products that are not individually packaged for sale to be sold as FSC certified, the vendor to the consumer is required to have CoC certification. Contractors and subcontractors are considered the end consumers and may demonstrate with copies of invoices (if requested) the quantity purchased for the job and their suppliers' CoC numbers.

2.9 COMPOSITE WOOD PRODUCTS

- A. Composite wood products such as particleboard, medium density fiberboard, hardwood veneer plywood, and structural composite wood shall comply with the Formaldehyde Emissions Evaluation, as defined in this Section.

2.10 PLUMBING FIXTURES

- A. All newly installed toilets, urinals, private lavatory faucets, and showerheads that are eligible for labeling must be WaterSense labeled.
- B. Plumbing fixtures scheduled in the Construction Documents have been specified to meet a calculated aggregate reduction in potable water consumption by a minimum of twenty percent (20%) compared to a LEED v4 calculated baseline. Substitutions shall not be allowed if such changes compromise the required reduction.

2.11 APPLIANCES

- A. Appliances shall meet the following requirements:
 1. Residential clothes washers: Energy Star or performance equivalent
 2. Commercial clothes washers: CEE Tier 3A
 3. Residential dishwashers (standard and compact): Energy Star or performance equivalent

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4. Pre-rinse spray valve flow rate: ≤ 1.3 gpm
 5. Ice machines: Energy Star or performance equivalent and use either air-cooled or closed-loop cooling, such as chilled or condenser water system

PART 3 - EXECUTION

3.1 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

- A. For the following credits, comply with Section 017419 – Construction and Demolition Waste Management and Disposal:
 1. MR Prerequisite 2 - Construction and Demolition Waste Management Planning
 2. MR Credit 5 - Construction and Demolition Waste Management

3.2 CONSTRUCTION INDOOR-AIR-QUALITY MANAGEMENT

- A. For the following credits, comply with Section 018119 – Construction Indoor Air Quality Requirements:
 1. EQ Credit 3 - Construction IAQ Management Plan
 2. EQ Credit 4 - Indoor Air Quality Assessment

3.3 EROSION AND SEDIMENTATION CONTROL

- A. SS Prerequisite 1 - Construction Activity Pollution Prevention: Comply with Section 312500 – Erosion and Sedimentation Control. Implement and document the Project Erosion and Sedimentation Control (ESC) Plan.
 - a. The contractor shall be responsible for the implementation of the ESC Plan in compliance with the 2012 U.S. Environmental Protection Agency Construction General Permit (CGP) or more stringent local equivalent, which may include, but shall not be limited to the following:
 - 1) The prevention of soil loss from stormwater runoff and wind erosion, including the protection and stockpiling of topsoil for reuse.
 - 2) The prevention of sedimentation of storm sewers and receiving streams.
 - 3) The prevention of air pollution from dust and particulate matter.

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- b. The contractor shall be responsible for the documentation of the pollution prevention measures implemented during construction, per Submittal requirements of this Section.

3.4 LEED APPRAISAL

- A. The Contractor is responsible for ensuring compliance with LEED prerequisites and credits highlighted in yellow in the LEED Appraisal in the Appendix of this Section.
- B. Updates to the LEED Appraisal will be provided by the LEED consultant throughout construction.

3.5 APPENDICES

- A. APPENDIX A-018113 – VOC LIMITS
- B. APPENDIX B-018113 – LEED APPRAISAL
- C. APPENDIX C-018113 – LEED v4 MATERIALS REPORTING FORM
- D. APPENDIX D-018113 – LEED BOUNDARY

END OF SECTION 018113

APPENDIX A-018113 – VOC LIMITS

| Product Category | | VOC Limit (g/L, less water and exempt compounds) |
|--|---|---|
| Adhesives: Architectural Applications | | |
| 1. | Building envelope membrane adhesive | 250 |
| 2. | Indoor carpet adhesive | 50 |
| 3. | Carpet pad adhesive | 50 |
| 4. | Ceramic glass, porcelain, & stone tile adhesive | 65 |
| 5. | Cove base adhesive | 50 |
| 6. | Drywall and panel adhesive | 50 |
| 7. | Multipurpose construction adhesive | 70 |
| 8. | Single ply roof membrane adhesives | 250 |
| 9. | All other roof adhesives | 250 |
| 10. | Rubber floor adhesive | 60 |
| 11. | Structural glazing adhesive | 100 |
| 12. | Structural wood member adhesive | 140 |
| 13. | Sub-floor adhesive | 50 |
| 14. | VCT and asphalt tile adhesive | 50 |
| 15. | Wood flooring adhesive | 100 |
| 16. | All other indoor floor covering adhesives | 50 |
| 17. | All other outdoor floor covering adhesives | 150 |
| Adhesives: Specialty Applications | | |
| 18. | Computer diskette manufacturing adhesive | 350 |
| 19. | Contact adhesive | 80 |
| 20. | Edge glue adhesive | 250 |
| 21. | PVC welding cement | 510 |
| 22. | CPVC welding cement | 490 |

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| 23. | ABS welding cement | 325 |
| 24. | ABS to PVC transition cement | 510 |
| 25. | All other plastic welding cements | 250 |
| 26. | Rubber vulcanization adhesive | 250 |
| 27. | Special purpose contact adhesive | 250 |
| 28. | Thin metal laminating adhesive | 780 |
| 29. | Tire tread adhesive | 100 |
| 30. | Top and Trim Adhesive | 250 |
| 31. | Waterproof resorcinol glue | 250 |
| 32. | All other adhesives | 250 |
| Adhesives: Substrate Specific Applications | | |
| 33. | Metal to metal | 30 |
| 34. | Plastic foams | 50 |
| 35. | Porous material (except wood) | 50 |
| 36. | Wood | 30 |
| 37. | Fiberglass | 80 |
| 38. | Reinforced plastic composite | 250 |
| Sealants | | |
| 39. | Clear, paintable, and immediately water-resistant sealant | 250 |
| 40. | Foam insulation | 250 |
| 41. | Foam sealant | 250 |
| 42. | Grout | 250 |
| 43. | Roadway sealant | 250 |
| 44. | Non-staining plumbing putty | 250 |
| 45. | Single Ply Roof Membrane | 450 |
| 46. | All other roof sealants | 300 |
| 47. | All other architectural sealants | 250 |

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| 48. | Marine Deck | 760 |
| 49. | All other sealants | 420 |
| Adhesive Primer | | |
| 50. | Plastic | 550 |
| 51. | Pressure sensitive | 250 |
| 52. | Traffic marking tape | 150 |
| 53. | Vehicle glass | 250 |
| 54. | All other adhesive primers | 250 |
| Sealant Primer | | |
| 55. | Architectural – Nonporous | 250 |
| 56. | Architectural – Porous | 775 |
| 57. | Modified Bituminous | 500 |
| 58. | Marine Deck | 760 |
| 59. | Other Sealant Primer | 750 |
| Paints and Coatings | | |
| 60. | Basement specialty coatings | 400 |
| 61. | Bond breakers | 350 |
| 62. | Clear wood finishes - Varnish | 275 |
| 63. | Clear wood finishes - Sanding sealers | 275 |
| 64. | Clear wood finishes - Lacquer | 275 |
| 65. | Colorant - Architectural coatings, excluding IM coatings | 50 |
| 66. | Colorant - Solvent-based IM | 600 |
| 67. | Colorant - Waterborne IM | 50 |
| 68. | Concrete - Curing compounds | 100 |
| 69. | Concrete - Curing compounds for roadways and bridges | 350 |
| 70. | Concrete masonry sealers | 100 |
| 71. | Concrete surface retarder | 50 |

| | | |
|-----|--|-----|
| 72. | Driveway sealer | 50 |
| 73. | Dry-fog coatings | 50 |
| 74. | Faux finishing coatings - Clear topcoat | 100 |
| 75. | Faux finishing coatings - Decorative coatings | 350 |
| 76. | Faux finishing coatings - Glazes | 350 |
| 77. | Faux finishing coatings - Japan | 350 |
| 78. | Faux finishing coatings - Trowel applied coatings | 50 |
| 79. | Fire-proofing coatings | 150 |
| 80. | Flats | 50 |
| 81. | Floor coatings | 50 |
| 82. | Form release compound | 100 |
| 83. | Graphic arts (sign) coatings | 200 |
| 84. | High temperature coatings | 420 |
| 85. | Industrial maintenance coatings | 100 |
| 86. | Industrial maintenance coatings – Color indicating safety coatings | 480 |
| 87. | Industrial maintenance coatings - High temperature IM coatings | 420 |
| 88. | Industrial maintenance coatings - Non-sacrificial anti-graffiti coatings | 100 |
| 89. | Industrial maintenance coatings - Zinc-rich IM primers | 100 |
| 90. | Magnesite cement coatings | 450 |
| 91. | Mastic coatings | 100 |
| 92. | Metallic pigmented coatings | 150 |
| 93. | Multi-Color coatings | 250 |
| 94. | Nonflat coatings | 50 |
| 95. | Nonflat coatings – high gloss | 150 |
| 96. | Pre-treatment wash primers | 420 |
| 97. | Primers, sealers, and undercoaters | 100 |

| | | |
|------|--|------|
| 98. | Reactive penetrating sealers | 350 |
| 99. | Recycled coatings | 250 |
| 100. | Roof coatings | 50 |
| 101. | Roof coatings, aluminum | 100 |
| 102. | Roof coatings, bituminous | 50 |
| 103. | Roof primers, bituminous | 350 |
| 104. | Rust preventative coatings | 100 |
| 105. | Sacrificial anti-graffiti coatings | 50 |
| 106. | Shellac - Clear | 730 |
| 107. | Shellac - Pigmented | 550 |
| 108. | Specialty primers, sealers, and undercoaters | 100 |
| 109. | Stains | 100 |
| 110. | Stains, interior | 250 |
| 111. | Stone consolidants | 450 |
| 112. | Swimming pool coatings | 340 |
| 113. | Traffic coatings | 100 |
| 114. | Tub and tile refinish coatings | 420 |
| 115. | Waterproofing membranes | 250 |
| 116. | Waterproofing sealers | 100 |
| 117. | Waterproofing concrete/masonry sealers | 100 |
| 118. | Wood coatings | 275 |
| 119. | Wood preservatives | 350 |
| 120. | Zinc-rich primers | 340 |
| 121. | Low solids coatings | 120* |

*measured in g/L of material

APPENDIX B-018113 – LEED APPRAISAL

LEED v4 for New Construction
CT DEEP West District HQ

| | | | |
|---------------|-----|-----|----|
| Achievability | | | |
| high | med | low | NP |
| 83 | 8 | 4 | 15 |

Certified: 40 to 49 points Silver: 50 to 59 points Gold: 60 to 79 points Platinum: 80 or more points
Achievability rating: High = 90%, Med = 60%, Low = 10%, NP = not possible.

80 Projected Points

| 1 0 0 0 | | | | Integrative Process | Standard |
|----------|---|--|--|--|--|
| 1 | | | | IP Credit 1 Integrative Process | Perform preliminary energy model and water budget before the completion of SD and document in OPR & BOD. |
| 3 1 0 12 | | | | Location & Transportation | Standard |
| | | | | LT Credit 1 LEED for Neighborhood Development Location | Locate the project in within a development certified under LEED for Neighborhood Development. |
| 1 | | | | LT Credit 2 Sensitive Land Protection | Locate the development footprint on land that has been previously developed - OR - does not meet LEED criteria for sensitive land (prime farmland, floodplains, habitat for threatened species, near water bodies, in or near wetlands). |
| | | | | LT Credit 3 High Priority Site | Locate the project on an area site in regional corridor (1pt) - LPA - site with priority designation (1pt) - UPR - urban/rural site where non-municipal infrastructure/development is required (1pt). |
| | | | | LT Credit 4 Surrounding Density and Diverse Uses | Locate on a site with an existing density of 22,000/sf/acre - 35,000 sf/acre and within 1/2 mile of 4-8 basic services. |
| | | | | LT Credit 5 Access to Quality Transit | Locate project within 1/2 mile of a rail station or ferry terminal that meets min. daily transit service - OR - 1/4 mile of bus, streetcar or ride-share that meets min. daily transit service. |
| 1 | | | | LT Credit 6 Bicycle Facilities (LEED V4.1) | Provide short term (2.5% peak visitors) and long term (5% all regular occupants) bike parking within 200ft (short term) of any main entrance and 300 ft (long term) of any functional entry, FTE showers, and access to bicycle network. |
| | 1 | | | LT Credit 7 Reduced Parking Footprint (LEED V4.1) | 1) Provide no off-street parking (1pt) OR 2) Provide parking capacity below base ratios determined by ITE Planning Handbook by 30% (1pt) OR 3) Provide dedicated parking for carshare vehicles (1pt) OR 4) Sell parking separately from all property sales or leases/implement a daily parking fee at a cost, equal to or greater than the daily cost of municipal public transit (1pt). |
| 1 | | | | LT Credit 8 Green Vehicles | Provide preferred parking for Green Vehicles for 5% of all parking spaces, and electric vehicle charging or alternative fuel facility for 2%. |
| 8 2 0 0 | | | | Sustainable Sites | Standard |
| Y | | | | SS Prereq 1 Construction Activity Pollution Prevention | Create and implement erosion control plan that meets the 2012 EPA Construction General Permit. |
| 1 | | | | SS Credit 1 Site Assessment | Complete comprehensive site survey; topography, hydrology, climate, vegetation, soils, human use and human health effects. |
| 2 | | | | SS Credit 2 Site Development: Protect or Restore Habitat (LEED V4.1) | Protect 40% of greenfield area, restore soils, and restore 25% of previously developed site with native/adapted plants (2pts) - OR - provide \$0.20/sf to accredited land trust (1pt). No FAR requirement, vegetated roofs may be used for this calculation. |
| 1 | | | | SS Credit 3 Open Space | Provide outdoor space greater than or equal to 30% of the total site area (including building footprint), with min. 25% vegetated. |
| 3 | | | | SS Credit 4 Rainwater Management (LEED V4.1) | Retain runoff for the 80th percentile (1pt) or 85th percentile (2pts) or 90th percentile (3pts) using low-impact development (LID) and green infrastructure (structural or non-structural). |
| | 2 | | | SS Credit 5 Heat Island Reduction | Meet high albedo requirements for roof and site (2pts) - OR - place a minimum of 75% parking under cover (1pt). |
| 1 | | | | SS Credit 6 Light Pollution Reduction | Meet uplight and light trespass requirements, and do not exceed exterior signage luminance requirements. |
| 11 0 0 0 | | | | Water Efficiency | Standard |
| Y | | | | WE Prereq 1 Outdoor Water Use Reduction: 30% | Reduce outdoor water use by 30% over the baseline specified in LEED. |
| Y | | | | WE Prereq 2 Indoor Water Use Reduction: 20% | Reduce indoor water use by 20% over the baseline specified in LEED, use fixtures with WaterSense label, and meet requirements for process water use. |
| Y | | | | WE Prereq 3 Building-Level Water Metering | Install permanent water meters for building and grounds, and commit to share data with USGBC for 5 years. |
| 10 | | | | WE ACP Whole Project Water Use Reduction | Reduce water usage by combining WE credits Outdoor and Indoor Water Use Reduction and Cooling Tower Water Use. Target up to 65% reduction for 10 points. |
| 1 | | | | WE Credit 4 Water Metering | Install permanent water meters for two or more water subsystems. |



10/30/2019

| 31 | 1 | 1 | 0 | Energy & Atmosphere | Standard |
|----|---|---|---|---|--|
| Y | | | | EA Prereq 1 Fundamental Commissioning and Verification | Engage commissioning agent by end of DD, develop and execute a commissioning plan, and prepare O&M plan for current facilities. |
| Y | | | | EA Prereq 2 Minimum Energy Performance | Reduce energy cost by 5%, compared to ASHRAE 90.1-2010, Appendix G, meet mandatory provisions of ASHRAE 90.1-2010. |
| Y | | | | EA Prereq 3 Building-Level Energy Metering | Install meters to provide data on total energy consumption, and commit to share data with USGBC for 5 years. |
| Y | | | | EA Prereq 4 Fundamental Refrigerant Management | Eliminate CFCs in building HVAC&R, and complete CFC phase-out conversion before project completion for any CFC equipment to remain. |
| 6 | | | | EA Credit 1 Enhanced Commissioning | Complete CD review, post occupancy review, and recommissioning manual (3pts), and develop monitoring procedures (+1pt) - AND/OR - complete envelope Cx (+2pts) |
| 6 | | | | EA Credit 2 Optimize Energy Performance: 6% / 8% / 10% / 12% / 14% / 16% | Reduce building energy cost by 6% / 8% / 10% compared to ASHRAE 90.1-2010, Appendix G. |
| 6 | | | | EA Credit 2 Optimize Energy Performance: 18% / 20% / 22% / 24% / 26% / 29% | Reduce building energy cost by 18% / 20% / 22% compared to ASHRAE 90.1-2010, Appendix G. |
| 6 | | | | EA Credit 2 Optimize Energy Performance: 32% / 35% / 38% / 42% / 46% / 50% | Reduce building energy cost by 32% / 35% / 38% compared to ASHRAE 90.1-2010, Appendix G. |
| | | 1 | | EA Credit 3 Advanced Energy Metering | Install energy metering for whole building energy and individual energy end uses representing 10% of more of total consumption. |
| 1 | 1 | | | EA Credit 4 Grid Harmonization (LEED V4.1) | Design building and equipment for participation in demand response programs through load shedding or shifting for any project, even if program is available (2pts) - OR - if DR program not available, provide infrastructure for future (1pt) OR implement one or more of the Load Flexibility and Management Strategies (1-2 pts) |
| 5 | | | | EA Credit 5 Renewable Energy (LEED V4.1) | Produce renewable energy on-site for 2% / 6% / 15% / 35% / 60% / 100% of building energy consumption, calculated by cost. Produce renewable energy off-site for 20% / 40% / 60% / 80% / 100% building energy consumption, calculated by cost. Existing renewable energy off-site for 60% / 80% / 100% building energy consumption, calculated by cost. Engage in a 5 year contract for at least 100% / 200% / 300% of the project's energy from Green-e Certified EACs & Carbon Offsets Engage in a 5 year contract for at least 150% of the project's energy from EACs & Carbon Offsets |
| 1 | | | | EA Credit 6 Enhanced Refrigerant Management | Select refrigerants with low global warming potential and ozone depletion potential. |
| 6 | 2 | 3 | 2 | Materials & Resources | Standard |
| Y | | | | MR Prereq 1 Storage & Collection of Recyclables | Provide space for the collection and storage of paper, cardboard, glass, plastic, metals, and at least two of the following: batteries, mercury-containing lamps, and electronic waste. |
| Y | | | | MR Prereq 2 Construction and Demolition Waste Management Planning | Develop and implement a construction and demolition waste management plan. |
| 1 | 1 | 1 | 2 | MR Credit 1 Building Life-Cycle Impact Reduction (LEED V4.1) | Option 4: Whole-building life-cycle assessment. Path 1 (1pt) conduct a LCA of the structure and enclosure; Path 2 (2pts) conduct a LCA of the projects structure and enclosure demonstrating a min. 5% reduction in at least 3 of the 6 categories (one must be GWP); Path 3 (3pts) conduct a LCA of the structure and enclosure demonstrating a 10% reduction; Path 4 (4pts) demonstrate a 20% reduction for GWP and 10% reduction in two other impact categories. |
| 1 | | 1 | | MR Credit 2 Building Product Disclosure & Optimization: (LEED V4.1) Environmental Product Declarations | Use 20 products sourced from five different manufacturers that meet disclosure criteria (1pt) LCA and EPD is 1 product, Product Specific Type III EPD is 1 product, Industry-wide Type III EPD with 3rd party certification is 1 product, Product specific type III EPD are 1.5 products - AND/OR - use products that exhibit optimized performance 10% by cost (1 pt.) or 10 products from 3 different manufacturers through a Life Cycle Impact Reduction Action Plan, Life Cycle Impact Reductions in Embodied Carbon or any of the 6 impact categories. |
| 1 | | 1 | | MR Credit 3 Building Product Disclosure & Optimization: (LEED V4.1) Sourcing of Raw Materials | Use products sourced that meet at least one responsible sourcing and extraction criteria (extended producer responsibility and/or take-back program (50%), bio-based materials (50%-100%), FSC certified wood products (100%), material reuse (200%), recycled content (100%)) for at least 20% from at least 3 different manufacturers (1 pt.) or 40% from at least 5 manufacturers of the total materials cost (2pts) |
| 1 | 1 | | | MR Credit 4 Building Product Disclosure & Optimization: (LEED V4.1) Material Ingredients | Use 20 products sourced from five different manufacturers that demonstrate the chemical inventory of the products (1pt) - AND/OR - use products from at least three different manufacturers that document their material ingredient optimization by 26-10% material cost or 10 compliant programs (1pt) through a Material Ingredient Screening and Optimization Action Plan, Advanced Inventory & Assessment or Material Ingredient Optimization |
| 2 | | | | MR Credit 5 Construction & Demolition Waste Management: 50% / 75% (LEED V4.1) | Divert 50%, three material streams (1pt) - OR - 75%, four material streams (2pts), - OR - generate less than 2.5 lbs waste/sf (2pts) |

| 13 | 2 | 0 | 1 | Indoor Environmental Quality | | Standard |
|----|---|---|---|------------------------------|---|---|
| Y | | | | EQ Prereq 1 | Minimum IAQ Performance | For mechanically ventilated spaces: Meet minimum outdoor air intake flow requirements determined by ASHRAE 62.1-2010 ventilation rate procedure, meet sections 4 through 7 of ASHRAE 62.1-2010, and monitor outdoor air intake flows. For naturally ventilated spaces: Meet minimum outdoor air opening and space configuration requirements determined by ASHRAE 62.1-2010 natural ventilation procedure; confirm natural ventilation is effective per CIBSE Applications Manual AM10, March 2005 Fig. 2.8.; and meet one of the following: measure exhaust airflow; provide automatic indication devices on natural ventilation openings; or monitor CO2 concentrations. |
| Y | | | | EQ Prereq 2 | Environmental Tobacco Smoke (ETS) Control | Prohibit smoking inside building, locate exterior smoking areas at least 25 feet away from building, and post no-smoking signage within 10 ft of all building entrances. |
| 2 | | | | EQ Credit 1 | Enhanced Air Quality Strategies | Provide entryway systems, prevent interior cross-contamination, and specify MERV 13 filters (1pt) - AND/OR - prevent exterior contamination or increase ventilation or monitor CO2 (1pt). |
| 3 | | | | EQ Credit 2 | Low-Emitting Materials: 2 / 3 / 4 / 5 categories (LEED V4.1) | Achieve the threshold level of compliance with VOC emissions and content standards for 2, 3, 4 or 5 product categories 1-3 pts - exemplary. |
| 1 | | | | EQ Credit 3 | Construction IAQ Management Plan (LEED V4.1) | Develop an IAQ plan for construction and preoccupancy phases that meets SMACNA IAQ Guidelines for Occupied Buildings Under Construction, 2nd edition, 2007, ANSI/SMACNA 008-2008, Chapter 3. |
| 1 | 1 | | | EQ Credit 4 | Indoor Air Quality Assessment (LEED V4.1) | Perform building flush out (1pt) or air quality testing (2pts). |
| 1 | | | | EQ Credit 5 | Thermal Comfort | Meet ASHRAE 55-2010, Thermal Comfort Conditions for Human Occupancy, provide individual thermal comfort controls for at least 50% of individual occupant spaces, and provide group controls for all shared multi-occupant spaces. |
| 2 | | | | EQ Credit 6 | Interior Lighting | Provide lighting controls for 90% of individuals and 100% of shared multi-occupant spaces (1pt) - AND/OR - meet four of LEED's lighting quality requirements (1pt). |
| 1 | 1 | | 1 | EQ Credit 7 | Daylight: 40% / 55% / 75% / 90% (LEED V4.1) | Option 1: Meet spatial daylight autonomy and annual sunlight exposure requirements as defined in IES LM-83-12 for each regularly occupied space through simulation. The average sDA value for the floor area is at least 40% (1pt), 55% (2pts), 75% (3pts) or each reg. occup. space achieves sDA of at least 55% (exemplary performance) - OR - Option 2: Simulation Illuminance Calculation - meet illuminance level requirements for percentage 55% (1pt), 75% (2pts), 90% (3pts) of regularly occupied floor area through simulation or Option 3: Measurement 55% at 1 time (1pt), 75% at 2 times (2pts), 90% at 2 times (3pts). |
| 1 | | | | EQ Credit 8 | Quality Views | Provide direct views to the outside that meet 2 out of 4 LEED view criteria in 75% of regularly occupied spaces. |
| 1 | | | | EQ Credit 9 | Acoustic Performance (LEED V4.1) | Meet requirements for HVAC background noise, sound isolation, reverberation time, & sound reinforcement for all occupied spaces. |
| 6 | 0 | 0 | 0 | Innovation | | Standard |
| 1 | | | | IN Credit 1.1 | Innovation, Green cleaning and Indoor Integrated Pest Management | Pending GBCI review and comment. |
| 1 | | | | IN Credit 1.2 | Innovation, Exemplary Performance: Renewable Energy Production | Pending GBCI review and comment. |
| 1 | | | | IN Credit 1.3 | Innovation, Purchasing Lamps | Pending GBCI review and comment. |
| 1 | | | | IN Credit 1.4 | Innovation, Exemplary Performance: Energy Performance | Pending GBCI review and comment. |
| 1 | | | | IN Credit 1.5 | Innovation, Green Building Education or Pilot Credit (TBD) | Pending GBCI review and comment. |
| 1 | | | | IN Credit 2 | LEED™ Accredited Professional | LEED Accredited Professional on design team. |
| 4 | 0 | 0 | 0 | Regional Priority | | Standard |
| 1 | | | | RP Credit 1.1 | Regional Priority, Optimize Energy Performance | Pursuant to USGBC determined zone-based regional priority credit |
| 1 | | | | RP Credit 1.2 | Regional Priority, Sensitive Land Protection | Pursuant to USGBC determined zone-based regional priority credit |
| 1 | | | | RP Credit 1.3 | Regional Priority, Light pollution reduction | Pursuant to USGBC determined zone-based regional priority credit |
| 1 | | | | RP Credit 1.4 | Regional Priority, Indoor water use reduction | Pursuant to USGBC determined zone-based regional priority credit |

12/12/2019

APPENDIX C-018113 – LEED v4.1 MATERIALS REPORTING FORM (FOR REFERENCE ONLY)

LEED v4.1 Materials Reporting Form
(New Construction & Commercial Interiors)

Please complete this form for all permanently installed products within the Divisions noted below. Check boxes for the appropriate product type and complete all fields as indicated. **Provide backup documentation for each environmental claim.** See page 2 for definitions.

Submittal Number: _____
 Submittal Name: _____
 Subcontractor: _____
 Product Name or Model #: _____
 Manufacturer: _____
 Manufacturer Contact: _____
 Total Material Cost (w/o site labor/equip): _____
 Location of Product: Interior Exterior
 (Relative to weatherproofing membrane)
 Extraction, manufacture, and purchase locations all within 100 miles? Y N

REQUIRED FOR ALL PRODUCTS - DIVS 3-12, 31, 32

1. MRc2 Environmental Product Declarations (EPD)
A. Does the product have one of the documents listed below:
 a) EPD or Life-Cycle Analysis (LCA)? Y N
 b) EPD/LCA with life cycle impact reduction action plan Y N
 c) EPD/LCA showing reduction in embodied carbon (GWP) Y N

2. MRc3 Sourcing of Raw Materials

A. Does the product meet a responsible sourcing attribute below?
 a) Take-back program Y N
 b) Bio-based materials%
 c) FSC Certified Wood%
 - COC# _____
 d) Materials reuse%
 e) Post-consumer recycled content.....%
 f) Pre-consumer recycled content.....%

3. MRc4 Material Ingredients

A. Does the product disclose material ingredients to at least 0.1% (1000 ppm) via an applicable program below:
 a) Manufacturer Inventory? Y N
 b) Health Product Declaration? Y N
 c) Cradle to Cradle Material Health Certificate? Y N
 d) Cradle to Cradle Certified Y N
 e) Declare Label? Y N
 f) ANSIBIFMA e3 Furniture Sustainability? Y N
 g) Product Lens Certification? Y N
 h) Facts - NSF/ANSI 336 Assessment? Y N
 B. Action plan to mitigate and reduce known hazards associated with this product's ingredients? Y N

REQUIRED FOR INTERIOR PRODUCTS - ALL DIVS

4. EQc2 Low-Emitting Materials
A. Select the applicable product type (choose one):
 Adhesive or Sealant
 Furniture Product
 Paint or Coating
 Flooring
 Wall Panel
 Ceiling
 Insulation (HVAC/plumbing excluded)
 Composite Wood (non-structural)
 Composite Wood (structural)
 None of the Above
 B. Is product inherently non-emitting? Y N
 C. Is product salvaged/reused? Y N
 D. Complete for interior adhesives, sealants, paints, & coatings:
 a) VOC Product Type: _____ g/L
 b) Provide VOC content (grams/Liter)
 c) Estimated installed volume (Liters) L
 d) VOC Emissions Evaluation* available? Y N
 e) Added Methylene Chloride or Perchloroethylene? Y N
 E. Complete for interior flooring, wall panels, ceilings, & insulation:
 a) VOC Emissions Evaluation* available? Y N
 F. Complete for composite wood products:
 a) Ultra-Low-Emitting Formaldehyde resins? Y N
 b) No Added Formaldehyde resins? Y N
 c) Tested per EN 717-1:2014 / complies with E1? Y N
 d) Moisture resistant adhesive meets ASTM 2559? Y N
 G. Complete for furniture products:
 a) Furniture Emissions Evaluation* available? Y N

Contractor Certification:

I, _____ a duly authorized representative of _____ hereby certify that the material information contained herein is an accurate representation of the material qualifications to be provided by us, as components of the final building construction. Furthermore, I understand that any change in such qualification during the purchasing period will require prior written approval from the Construction Manager and Owner.
 Signature of Authorized Representative _____ Date: _____

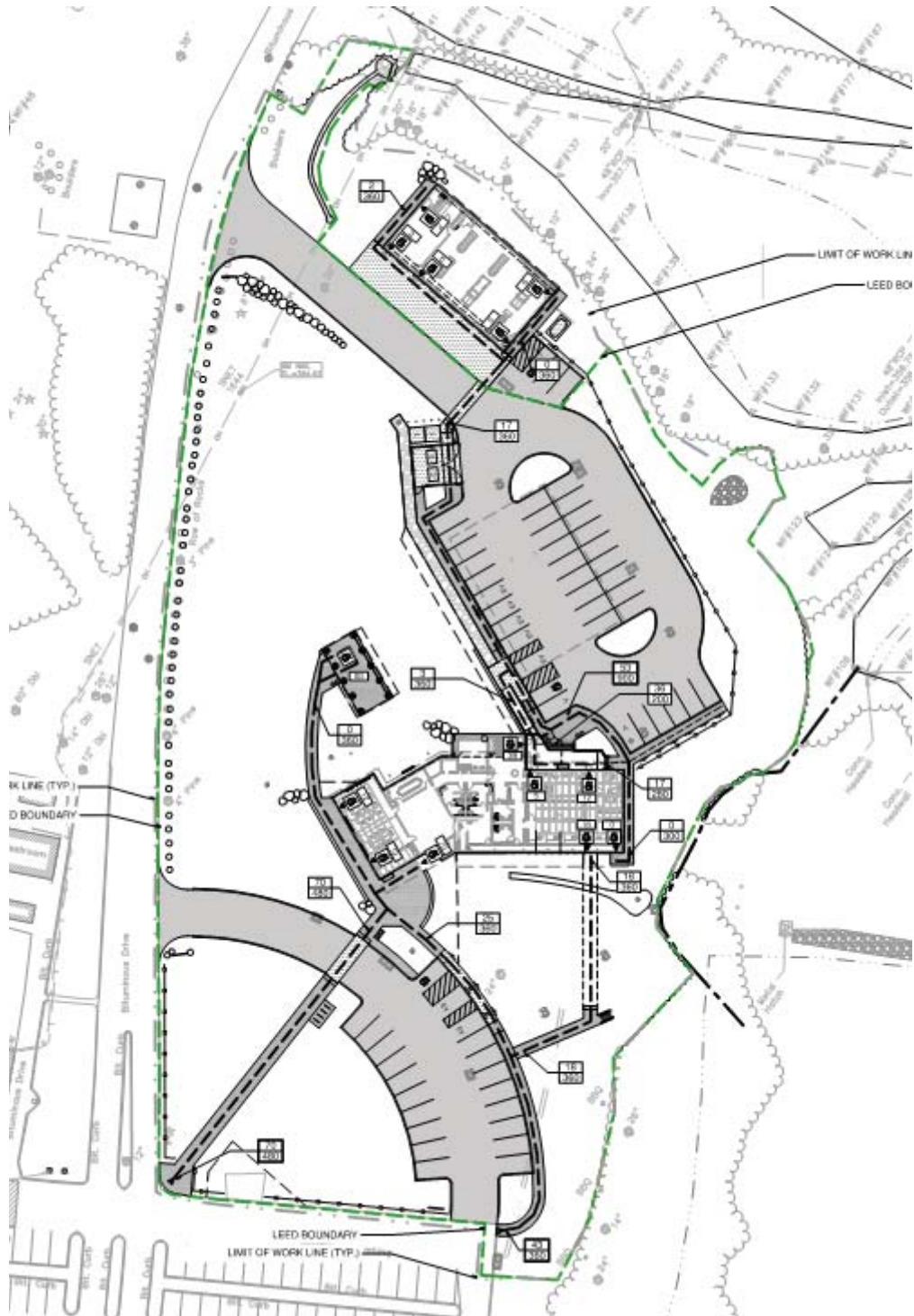
FOR A10 REVIEWER TO COMPLETE / INTERNAL USE

1. Exceptions taken to product? Y N
 2. Resubmission needed with additional info? Y N
 3. EPD/LCA Type?
 LCA
 Industry-wide Type III EPD (ext.)
 Product-specific Type III EPD (incl.)
 Product-specific Type III EPD (ext.)
 No EPD
 4. Mfrtr Inventory Type?
 CASRN or EC Number
 Greenscreen LT
 Full Greenscreen BM
 GHS 2015
 No Mfrtr Inventory
 5. Declare Label Type?
 Red List Free Declared LBC Compliant N/A
 6. Cradle to Cradle version and level? _____
 7. MRc4 Option 2 Adv. Inventory/Assessment? Y N
 8. TVOC Range (if applicable):
 <0.5 mg/m³ 0.5-5.0 mg/m³ >5.0 mg/m³
 9. Notes: _____

* See the USGBC Low-Emitting Materials Third Party Certification table for acceptable 3rd party certifications and programs: <https://www.usgbc.org/resources/low-emitting-materials-third-party-certification-table>



APPENDIX D-018113 – LEED BOUNDARY



SECTION 018119 – CONSTRUCTION INDOOR AIR QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
 - 1. Sustainable Design Requirements – Section 018113
- B. All technical Sections of the Specifications related to interior construction and finish materials, MEPFP systems, and items affecting indoor air quality.
- C. LEED Reference Guide for Building Design and Construction (BD+C), version 4, U.S. Green Building Council.
- D. LEED v4.1 Building Design and Construction (BD+C), Getting Started Guide for Beta Participants (Beta Guide), U.S. Green Building Council

1.2 DESCRIPTION OF WORK

- A. This Section includes:
 - 1. Requirements for the development of a Construction Indoor Air Quality Management Plan (herein referred to as the Plan). The Plan shall be developed by the Contractor and approved by the Owner and Architect.
 - 2. Requirements for documenting the continuous implementation of the Construction Indoor Air Quality Management Plan throughout all applicable phases of construction. The Plan shall be implemented throughout the duration of the Project construction under the direction of the Contractor's IAQ Representative and shall be documented per the Submittal Requirements in Part 1 of this Section.
 - 3. Requirements and documentation for LEED Certification. The Plan is part of the Project LEED Requirements. Note: For clarity, identification numbers have been added to LEED v4.1 prerequisite and credit names as used throughout this Section.

1.3 CONSTRUCTION IAQ MANAGEMENT GOALS FOR THE PROJECT

- A. The Owner has established that this Project shall minimize the detrimental impacts on Indoor Air Quality (IAQ) resulting from construction activities. Factors that contaminate indoor air, such as dust entering HVAC systems and ductwork, improper storage of materials on-site, and poor housekeeping, shall be minimized through development and implementation of a Construction Indoor Air Quality (IAQ) Plan.
- B. During construction, meet or exceed all recommended control measures of SMACNA IAQ Guidelines for Occupied Buildings under Construction, 2nd Edition, 2007, ANSI/SMACNA 008-2008, Chapter 3.
- C. Establish better quality indoor air in the building through implementation of a flush-out or air testing after construction but before occupancy.

1.4 SUSTAINABLE BUILDING REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.5 REFERENCES

A. Acronyms and Abbreviations

1. ANSI: American National Standards Institute.
2. ASHRAE: The American Society of Heating, Refrigerating and Air-Conditioning Engineers.
3. EQ: Environmental Quality
4. HEPA: HIGH-EFFICIENCY PARTICULATE
5. IAQ: Indoor Air Quality.
6. LEED: Leadership in Energy and Environmental Design
7. MERV: Minimum Efficiency Reporting Value.
8. NC: New Construction
9. SMACNA: Sheet Metal and Air Conditioning National Contractors Association.
10. USGBC: US Green Building Council
11. VOC: Volatile Organic Compound.

B. Reference Standards

1. ANSI/SMACNA 008-2008, "IAQ Guidelines for Occupied Buildings Under Construction", Second Edition 2007, Chapter 3, The Sheet Metal and Air Conditioner National Contractors Association (SMACNA), www.smacna.org.
2. ANSI/ASHRAE 52.2-2017, "Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size", www.ashrae.org.
3. ASTM D5149-02, "Standard Test Method for Ozone in the Atmosphere: Continuous Measurement by Ethylene Chemiluminescence."
4. ASTM D5197-16, "Standard Test Method for Determination of Formaldehyde and Other Carbonyl Compounds in Air (Active Sampler Methodology)."
5. U.S. Environmental Protection Agency (EPA) "Compendium of Methods for the Determination of Air Pollutants in Indoor Air."

C. Definitions

1. Volatile Organic Compounds (VOC's): Carbon compounds that participate in atmospheric photochemical reactions (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonates, and ammonium carbonate). The compounds vaporize (become a gas) at normal room temperatures. These compounds are common in and emitted by many building products, including solvents in paints, coatings, adhesives and sealants, wood preservatives; composite wood binder, and foam insulations. Not all VOC's are harmful, but many of those contained within building products contribute to the formation of smog and may irritate building occupants or construction workers by their smell and/or health impact.
 - a. Materials that act as "sinks" for VOC contamination: absorptive materials, typically dry and soft (such as textiles, carpeting, acoustical ceiling tiles and gypsum board) that readily absorb VOC's emitted by "source" materials and release them over a prolonged period of time.
 - b. Materials that act as "sources" for VOC contamination: products with high VOC contents that emit VOC's either rapidly during application and curing (typically "wet" products, such as paints, sealants, adhesives, caulks and sealers) or over a prolonged period (typically "dry" products such flooring coverings with plasticizers and engineered wood with formaldehyde).
2. Minimum Efficiency Reporting Value (MERV): Filter rating established by ASHRAE and determined according to ASHRAE Standard 52.2-2017. MERV categories range from 1 (very low efficiency) to 16 (very high efficiency),

1.6 CONSTRUCTION IAQ MANAGEMENT PLAN - OVERVIEW

- A. The Contractor shall implement indoor air quality management during construction per the requirements of LEED v4.1 EQ Credit 3 – Construction Indoor Air Quality Management Plan.
- B. As directed by the Owner, the Contractor shall assist in coordinating and implementing an indoor air quality assessment after construction ends and before occupancy, per the requirements of LEED v4.1 EQ Credit 4 – Indoor Air Quality Assessment.
- C. The Contractor shall prepare and submit a Construction IAQ Management Plan for the construction and pre-occupancy phases of the Project to the Owner and Architect. The Plan shall meet the following criteria:
 1. Construction Phase
 - a. Construction activities shall be planned to meet or exceed the minimum requirements included in the SMACNA "IAQ Guidelines for Occupied Buildings Under Construction", as listed in PART 1 of this Section.
 - b. Absorptive or porous materials shall be protected from moisture damage when stored on-site and after installation. Contractor shall not install water damaged materials in the building.
 - c. Filtration media shall be installed to protect ductwork and/or HVAC equipment used during the construction process, per the requirements of PART 2 of this Section.

- d. The use of tobacco products shall be prohibited inside the building and within 25 feet of the building entrance during construction.
- e. Only low-emitting and low- or no-VOC products shall be installed in the field on the interior of the Project, per the requirements of Division 01 Section 018113 - Sustainable Design Requirements. Examples of such products include, but are not limited to, adhesives, sealants, paints, coatings, and carpet.
- f. A Sequence of Finish Installation Plan shall be developed, highlighting measures to reduce the absorption of VOCs by materials that act as “sinks”.
- g. Upon approval of the Plan by the Owner and Architect, it shall be implemented by the Contractor and Subcontractors throughout the duration of the construction process and documented in accordance with the LEED Submittal Requirements of this Section.

2. Pre-Occupancy Phase

- a. All occupiable and habitable spaces within the Project shall be subject to either an air flush-out or air testing after construction and immediately prior to occupancy, as directed by the Owner and described in PART 1 of this Section, per the requirements of LEED v4.1 EQ Credit 4 – Indoor Air Quality Assessment.

1.7 CONSTRUCTION IAQ MANAGEMENT PLAN (CONSTRUCTION PHASE) – DETAILED REQUIREMENTS

- A. The SMACNA “IAQ Guidelines for Occupied Buildings Under Construction” (Chapter 3) outline IAQ measures in five categories as listed below. The Construction IAQ Management Plan shall be organized in accordance with the SMACNA format and shall address measures to be implemented by the Contractor and/or Subcontractors in each of the five SMACNA categories (including subsections). All subsections shall be listed in the Plan; items that are not applicable for this project should be listed as such.

1. HVAC Protection

- a. Return Side
 - 1) Operation of permanent air handling equipment during construction:
 - a) Operate only with the prior written approval from the building Owner.
 - b) Install minimum MERV 8 filters at each return air grill and each return transfer duct inlet opening. Do not permit air flow to bypass the filtration media. Dual filtration (e.g. MERV 7 followed by MERV 11 filtration) shall not be an acceptable substitution.
 - c) Immediately before occupancy, at permanent filter locations install new filtration media in accordance with the design requirements and manufacturer’s installation instructions.
 - 2) Seal with plastic all return system openings in, or immediately adjacent to, the construction area.
 - 3) Block or damper off heavy work areas from HVAC system if temporary imbalance of the return air system does not create a problem.

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- 4) Do not store construction or waste materials in mechanical rooms with return-side equipment.
- b. Central Filtration
 - 1) Upgrade filter efficiency (e.g. 60 to 80 percent dust spot efficiency) where major dust loading is expected to impact operating HVAC systems.
 - 2) Consider using filtration with media such as activated charcoal or potassium permanganate where source control options for construction-related odors are not sufficiently effective.
 - c. Supply Side
 - 1) Wrap in plastic any equipment left in place; isolated ducts serving occupied and construction areas; protect new equipment from weather, dust and physical damage by storing equipment in clean, protected areas shielded from rain and moisture.
 - 2) When the system is off for the duration of construction: seal diffusers and window units in plastic; frequently inspect ducts, diffusers, and window units for cleanliness upon completion of the work, and clean where needed.
 - 3) If particulate discharge after system start-up is minor, delay occupancy until dust may be sufficiently cleaned up.
 - 4) If particulate discharge after system start-up is severe, install temporary coarse filters on diffusers or clean ducts as necessary.
 - 5) Check the condition of the main filters whenever visible particulates are discharged from the system.
 - d. Duct Cleaning
 - 1) Conduct a detailed visual inspection of the system to determine if excessive dust or debris is in the system, and determine most appropriate cleaning method as necessary. Clean the ducts and associated equipment before occupancy using specialized equipment and professional expertise to ensure dust is effectively removed and contained.
2. Source Control
 - a. Product Substitution
 - 1) Use only materials which comply with VOC limit requirements, emissions testing requirements, and chemical component restrictions in accordance with Section 018113 – Sustainable Design Requirements.
 - b. Modifying Equipment Operation
 - 1) Modify equipment operation as needed to meet IAQ objectives. Modifications may include substitutions for cleaner equipment or adjustments in operating procedures.
 - c. Changing Work Practices
 - 1) Establish measures for contaminant source control resulting from construction processes. For example, contain the oil from construction processes and equipment so it does not contact concrete.
 - 2) Consider using demolition techniques that produce less airborne dust.
 - 3) Consider painting techniques that release less odor.
 - 4) Consider cleaning practices that raise less dust.
 - 5) Consider using hand tools instead of power tools, when feasible.

- 6) Consider using vacuum-assisted drywall sanders and concrete saws to control dust.
- d. Local Exhaust
 - 1) Directly exhaust pollution sources to the outside. Provide special filtration for exhaust if necessary, and ensure emissions to the outside comply with applicable outdoor air regulations.
 - 2) Ensure exhaust separation distances from fresh air-intakes, windows, and occupant entry ways meet applicable codes. Typical recommendation for separation distance is a minimum of 30 feet.
- e. Air Cleaning
 - 1) Where exhaust is not feasible, consider local recirculation of air through a portable air cleaner. Choose a filter type that is appropriate for the material being controlled.
- f. Cover or Seal
 - 1) Reduce VOC emissions from evaporation by sealing or covering possible sources of emissions.
 - a) An enclosed tanker is preferable to an open kettle for roofing.
 - b) Keep containers of wet products closed when not in use.
 - c) Cover or seal waste materials that may release dust, odor, or other contaminants.
 - d) Control surfaces that are persistent odor sources by applying a sealer.
- g. Store solvent-contaminated rags in closed, flame-proof containers.
- h. Enforce the no-smoking job site policy.
- 3. Pathway Interruption
 - a. Depressurize the work area.
 - b. Pressurize occupied space by increasing supply air or reducing return/exhaust air in areas occupied during construction. Consider extending HVAC system fan schedule to pressurize occupied spaces 24 hours per day.
 - c. Erect barriers to contain construction areas.
 - d. Relocate pollutant sources and/or temporarily redirect air intakes when project equipment or staging areas coincide with critical airflow pathways.
 - e. Temporarily seal the building to exterior emissions if deemed necessary and allowed by building code.
- 4. Housekeeping
 - a. Suppress dust with wetting agents or sweeping compounds. Increase the cleaning frequency for dust based on visible inspection.
 - b. Use efficient dust collection methods, such as a damp rag, wet mop, or a vacuum equipped with a high efficiency particulate filter, wet scrubber, or exterior exhaust.

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- c. Keep all surfaces, including high ledges, areas behind furniture, and surfaces inside mechanical equipment, clean. Consider covering contents prior to construction activity or installing elements after dust generation has ceased to facilitate the cleaning process.
 - d. Remove spills, excess applications of solvent-containing products, and accumulated water as soon as possible. Spot removers and cleaning agents should be low odor emitters.
 - e. Use vacuum cleaners with high-efficiency particulate (HEPA) filtration.
 - f. Protect absorptive, porous materials and other building systems installed or stored on-site from exposure to moisture and contamination.
 - 1) Store materials on elevated platforms under cover and in a dry location.
 - 2) If materials are not stored in an enclosed location, cover tops and sides of material with secured, waterproof sheeting.
 - 3) Phase construction to ensure that absorptive materials are installed only in areas that are weather-tight.
 - 4) Provide a description of corrective measures that will be taken if absorptive materials are exposed to moisture during construction.
 - g. Use specialized cleaning procedures, as specified in the NIBS guidelines, when stripping lead-based paint.

5. Scheduling

- a. Sequence construction activities and installation of materials to minimize impact on indoor air quality.
- b. Install absorptive-finish materials after wet-applied materials have fully cured whenever possible.
- c. Institute cleaning activities concentrated on removal of contaminants from HVAC systems and building spaces prior to occupancy, including cleaning of coils, air filters, and fans.
- d. Replace filtration media (MERV 13 or better) immediately prior to substantial completion and occupancy. Dual filtration (e.g. MERV 7 followed by MERV 11 filtration) shall not be an acceptable substitution.
- e. Provide a description of measures taken to ensure appropriate IAQ levels after occupation of interior construction and finish work.
- f. Schedule installation during unoccupied periods.
- g. Avoid building occupancy while construction-related pollutants and odors are still present.

B. Protection of Materials from Moisture Damage: Under the Housekeeping section of the Plan, describe measures to prevent installed materials or material stored on-site from moisture. This section should also describe measures to be taken if moisture damage does occur to absorptive materials during the course of construction.

- 1. Store materials on elevated platforms or pallets under cover and in a dry location.

2. If materials are not stored in an enclosed location, cover tops and sides of materials with waterproof sheeting, securely tied.
 3. Phase construction such that absorptive materials are installed only in areas that are weather-tight.
- C. Protection of Ductwork: Under the HVAC Protection section of the Plan, describe measures to protect air handling and distribution equipment and air supply and return ducting during construction.
1. All ductwork arriving on site shall have the ends and openings sealed with plastic sheeting and stored on pallets or dunnage until installed. Plastic seals shall remain in place during ductwork installation and shall be repaired or replaced as necessary to maintain continuous protection throughout the duration of construction.
 2. The Contractor shall cover and protect all exposed air inlets and outlets, openings, grilles, ducts, plenums, etc. to prevent water, moisture, dust and other contaminant intrusion.
 3. All ductwork shall be stored on site above the ground or floor slabs.
 4. Ducting runs shall be protected at the end of each day's work.
 5. The Contractor shall apply protection immediately after ducting.
 6. The Contractor's designated IAQ Representative shall inspect work and monitor subcontractor(s) to ensure compliance.
- D. Temporary Filtration: The Contractor shall inspect temporary filtration weekly and replace as required to maintain the proper ventilation rates in the building.
1. Filtration Media shall meet the requirements as listed in PART 2 of this Section.
- E. Replacement of Filtration Media: Under the HVAC Protection section of the Plan, provide a description of the filtration media in all ventilation equipment used during construction. The description shall include replacement criteria for filtration media during construction and confirmation of filtration media replacement for all equipment immediately prior to occupancy.
1. Filtration media shall meet the requirements of PART 2 of this Section. As part of required LEED Submittals outlined in PART 1 of this Section, at the end of construction the Contractor shall provide a confirmation that all filtration media were replaced prior to occupancy.
- F. Sequence of Finish Installation for Materials
1. Absorptive materials should be installed after the installation of materials or finishes which have high short-term emissions of VOC's, formaldehyde, particulates, or other air-borne compounds.
 - a. Absorptive materials ("sinks") include but are not limited to: carpets; acoustical ceiling panels; fabric wall coverings; insulations (exposed to the air stream); upholstered furnishings; and other woven, fibrous or porous materials.

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- b. Materials with high short-term emissions ("sources") include, but are not limited to: adhesives, sealants and glazing compounds (specifically those with petrochemical vehicles or carriers); paints, wood preservatives and finishes; control and/or expansion joint fillers; hard finishes requiring adhesive installation; finish processes and products associated with gypsum board installation; and composite or engineered wood products with formaldehyde binders.
- 2. The Contractor shall develop a Sequence of Finish Installation Plan and schedule that identifies how the sequencing of finish material installation will occur for the project. The schedule shall be submitted to the Owner and Architect in accordance with the Submittal Requirements of this Section.
- G. Ventilation during installation of materials and finishes: Outside air shall be provided during the installation of materials and finishes, beginning after the building is substantially enclosed. If permanent building HVAC systems are used to supply the ventilation air, filtration media shall be installed per the requirements of PART 2 of this Section.

1.8 CONSTRUCTION IAQ MANAGEMENT PLAN (PRE-OCCUPANCY PHASE) – DETAILED REQUIREMENTS

- A. As directed by the Owner, the Contractor shall assist in coordinating and implementing one of the following compliance options after construction ends and before occupancy, once all interior finishes and movable furnishings are installed, major VOC-related punch list items are finished, and the building is completely cleaned, per the requirements of LEED v4.1 EQ Credit 4 - Indoor Air Quality Assessment:
 - 1. OPTION 1 - Flush-Out:
 - a. Perform building flush-out in accordance with the requirements outlined in the LEED v4.1 Building Design and Construction (BD+C), Getting Started Guide for Beta Participants (Beta Guide), U.S. Green Building Council.
 - b. Note that this Option includes two potential paths to perform the flush-out either before or during occupancy.
 - 2. OPTION 2 - Air Testing: Conduct baseline IAQ testing in accordance with the requirements and standard methods outlined in the LEED v4.1 Building Design and Construction (BC+C), Getting Started Guide for Beta Participants (Beta Guide), U.S. Green Building Council. Concentrations of contaminants shall be tested and shall not exceed maximum levels specified in the Beta Guide. For each sampling point where the concentration exceeds the limit, take corrective action and retest for the noncompliant contaminants at the same sampling points. Repeat until all requirements are met.

1.9 LEED SUBMITTAL REQUIREMENTS

- A. The Contractor shall submit the following required records and documents:
 - 1. Prior to start of construction, submit the following:
 - a. A construction schedule outlining the start-up date and expected duration of all Construction IAQ Management Plan control measures.

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- b. A copy of the Construction IAQ Management Plan and the Sequence of Finish Installation Plan for approval by the Owner and Architect, as defined in PART 1 of this Section.
 2. Product cut-sheets for all filtration media used during construction and installed immediately prior to occupancy, with MERV values highlighted and meeting the criteria for filtration media in PART 2 of this Section. Cut sheets shall be submitted with the Contractor's 'approved' stamp as confirmation that the products submitted are the same products installed on the project.
 3. At end of construction, submit the following:
 - a. Photographs that document the implementation of the Construction IAQ Management Plan throughout the course of the project construction. Submit a minimum of (18) photographs, (6) photographs taken on at least (3) different occasions during construction, each labeled with the SMACNA control measure illustrated. Examples include photographs of ductwork sealing and protection, temporary ventilation measures, and conditions of on-site materials storage to prevent moisture damage. Photographs shall include integral date stamping and shall be submitted with brief descriptions or be referenced to project meeting minutes or similar project documents.
 - b. Construction IAQ Management Summary Report.
 - c. Narrative describing measures taken to protect absorptive materials from moisture damage.
 - d. Required documentation for LEED v4.1 EQ Credit 3 Construction Indoor Air Quality Management Plan and EQ Credit 4 Indoor Air Quality Assessment, including completed LEED Online credit forms and required supporting documentation uploaded to the LEED Online website.

1.10 LEED SUBMISSION DOCUMENTATION

- A. The Construction Manager shall provide documentation for the LEED submission.
 1. At or before substantial completion, the Construction Manager shall prepare supporting documentation for each LEED construction prerequisite and credit to be attempted, which have been assigned to the Construction Manager by the Owner or Sustainability Coordinator.
 2. The Construction Manager shall register and log-in to LEED Online (<http://www.leedonline.com>).
 3. The Construction Manager shall complete LEED Online credit forms and upload backup documentation and associated LEED Calculators. The LEED Online credit forms and supporting documentation shall contain:
 - a. All proper data fields completed declaring that the project has met the intent of the credit, including narrative(s) when applicable.
 - b. Electronic signature of Construction Manager and date signed, where required.

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4. The Construction Manager shall notify Sustainability Coordinator of completion of LEED Online documentation and availability for review and coordinate with Sustainability Coordinator for preparation of final documentation of LEED submission.

1.11 QUALITY ASSURANCE

- A. Contractor IAQ Representative: IAQ Engineer with five (5) years' experience performing IAQ supervision on projects of comparable size and scope.
- B. IAQ Testing Agency: Independent testing and inspecting agency, subject to approval by the Owner and meeting the following qualifications:
 1. Minimum of five (5) years' experience in performing the types of testing specified herein and to meet requirements of LEED v4.1 EQ credit 4 Indoor Air Quality Assessment, Option 2, on projects of comparable size and scope.
 2. Laboratories that conduct tests must be accredited under ISO/IEC 17025 for the test methods used.

PART 2 PRODUCTS

2.1 FILTRATION MEDIA

- A. Construction filters: If permanently installed air handlers are used during construction, filtration media must be installed at each return grill and air handling unit, having a Minimum Efficiency Reporting Value (MERV) of at least 8 as determined by ASHRAE Standard 52.2-2017. All construction filtration media shall be replaced immediately prior to occupancy.
- B. Flush-out filters: If the Flush-out option will be pursued for LEED v4.1 EQ credit Indoor Air Quality Assessment, as described in PART 1 of this Section, new filtration media shall be installed at air handling units having a Minimum Efficiency Reporting Value (MERV) of 13 as determined by ASHRAE Standard 52.2-2017.
- C. Final filters: Replace all filtration media immediately prior to occupancy. For all ventilation systems that supply outside air, install filters having a Minimum Efficiency Reporting Value (MERV) of 13 or better as determined by ASHRAE Standard 52.2-2017.

2.2 BUILDING MATERIALS

- A. Low-emitting products specified in technical Sections of the Project Manual. VOC content and emissions shall comply with requirements specified in Division 01 Section 018113 - Sustainable Design Requirements.
- B. Dust Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches, commencing with installation of finishes inside the Project.

2.3 CLEANING SUPPLIES

- A. Use low toxicity cleaning supplies for surfaces, equipment and workers personal use, during periodic and final cleaning. Comply with requirements for closeout and final cleaning specified in Division 01.

PART 3 – EXECUTION

3.1 IMPLEMENTATION AND COORDINATION

- A. The Contractor shall be responsible for implementation of the Construction IAQ Management Plan and for the coordination of the Plan with all affected trades per the requirements of PART 1 of this Section.
 - 1. The Contractor shall designate one individual as the Construction IAQ Representative, who will be responsible for communicating the progress of the Plan with the Owner and Architect on a regular basis and for assembling the required LEED documentation.
 - 2. The Contractor shall include provisions in the Construction IAQ Management Plan for addressing conditions in the field that do not adhere to the Plan, including provisions to implement a stop work order or to rectify non-compliant conditions.
 - 3. Assign an on-site Construction Air Quality Control Representative to coordinate issues associated with implementation of the Plan.
 - 4. Designate responsibility to Contractors and Subcontracted Trades for the implementation of specific control measures as indicated in the Plan.
- B. The Contractor shall include procedures related to IAQ Management on the agenda during pre-construction meetings and during regularly scheduled meetings on the jobsite. Minutes shall be recorded at all such meetings.
- C. Trade subcontractors shall be responsible for the implementation of specific control measures, as specified in the Construction IAQ Management Plan. Subcontractors shall coordinate their responsibilities through the Contractor and their designated Construction IAQ Representative.

- END OF SECTION -

SECTION 019113 – GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, specifications and other general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Sections, apply to this Section.
- B. Owner's Project Requirements (OPR) and the Basis of Design (BOD) documentation prepared by the Owner and Architect / Engineer, respectively, contain requirements that apply to this section.
- C. Related Sections
 - 1. Division 3 (ALL SECTIONS)
 - 2. Division 4 (ALL SECTIONS)
 - 3. Division 6, Section 061200 Structural Insulated Panels (SIPs)
 - 4. Division 7 (ALL SECTIONS)
 - 5. Division 8 (ALL SECTIONS)
 - 6. Division 9 (ALL SECTIONS)
 - 7. Division 13(ALL SECTIONS IF APPLICABLE)
 - 8. Division 21, Section 210500 Common Work Results for Fire Suppression
 - 9. Division 22, Section 220500 Common Work Results for Plumbing
 - 10. Division 23, Section 230500 Common Work Results for HVAC
 - 11. Division 23, Section 230593 Testing, Adjusting and Balancing for HVAC
 - 12. Division 23, Section 230923 Direct-Digital Control System for HVAC
 - 13. Division 23, Section 230993 Sequence of Operations for HVAC Controls
 - 14. Division 26, Section 260400 General Conditions for Electrical
 - 15. Division 27 (ALL SECTIONS)
 - 16. Division 28 (ALL SECTIONS)

1.2 SUMMARY

- A. This section includes requirements for Commissioning during the pre-design phase, design phase, construction phase and the building turnover phase. This section includes general Commissioning requirements for all specified and associated systems, sub systems and equipment. The intent of this section is to specify the Commissioning responsibilities of the General Contractor and their subcontractors (referred to herein as the Contractor, Heating, Ventilation and Air conditioning (HVAC) Subcontractor, Testing, Adjusting and Balancing (TAB) Subcontractor, Automated Temperature Controls (ATC) Subcontractor, etc..). The Contractor will assure participation and cooperation of their Subcontractors as required throughout the duration of the Commissioning process.
- B. This project has been designed and will be Commissioned in accordance with the requirements of the US Green Building Council's Leadership in Energy and Environmental Design (LEED) V4.1 program. This Section includes all requirements of the LEED V4.1 program for Energy and Atmosphere Prerequisite Fundamental Commissioning and Verification.

- C. This project has been designed and will be Commissioned in accordance with the requirements of the US Green Building Council's Leadership in Energy and Environmental Design (LEED) V4.1 program. This Section includes all requirements of the LEED V4.1 program for Energy and Atmosphere Prerequisite Fundamental Commissioning and Verification and Energy and Atmosphere Enhanced Commissioning Option 1 /Path 2 (Enhanced & Monitoring Based Commissioning).
- D. This project has been designed and will be Commissioned in accordance with the requirements of the US Green Building Council's Leadership in Energy and Environmental Design (LEED) V4.1 program. This Section includes all requirements of the LEED V4.1 program for Energy and Atmosphere Prerequisite Fundamental Commissioning and Verification and Energy and Atmosphere Enhanced Commissioning Option 2 (Envelope Commissioning).

1.3 DEFINITIONS

- A. Architect: Includes Architect identified in the Contract for Construction between Owner and Contractor.
- B. Automated Temperature Controls (ATC): This term is inclusive of any and all automated controls, building management systems, energy management systems and their various networks, software and components.
- C. Basis of Design (BOD): A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.
- D. Commissioning Authority (CxA): The individual or group engaged under separate contract to the Owner responsible for executing the Commissioning requirements.
- E. Commissioning Plan: An informational document that outlines the organization, schedule, allocation of resources, and documentation requirements of the Commissioning process.
- F. Contractor: The prime contractor (Construction Manager or General Contractor) identified in the Contract for Construction between Owner and Contractor.
- G. Energy Management Information System (EMIS): This term is inclusive of any and all tools and services utilized to manage commercial building energy use. These technologies include, for example, the energy information system, equipment-specific fault detection and diagnostic systems, benchmarking and utility tracking tools, automated system optimization tools, and building automation systems.
- H. Engineer of Record: Includes the design Engineer(s) identified in the Contract for Construction between Owner and Contractor, responsible for design of HVAC, electrical, communications, controls for HVAC systems and other related building systems.
- I. Monitoring Based Commissioning (MBCx): MBCx is a process which maintains and continuously improves building performance over time. MBCx is defined as the implementation

of an ongoing commissioning process with focus on monitoring and analyzing large amounts of data on a continuous basis.

- J. **Monitoring Based Commissioning Plan:** The MBCx Plan is the key document for defining the analysis that will occur during the MBCx process. The metrics, views, and analytics in the plan will be made available through the EMIS. The MBCx Plan provides facility operators with a quick reference guide on what will be tracked to keep the HVAC and lighting control systems optimized over time.
- K. **Owner's Project Requirements (OPR):** A document that details the program requirements of a project and the expectations of how it will be used and operated. These include project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information. This document **MUST** include systems to be commissioned as well as building envelope
- L. **Pre-Functional Checklists:** Provided by the CxA, these checklists are tools to help the Subcontractors verify that the installation complies with the Contract Documents and is complete and ready for functional performance testing.
- M. **Subcontractor:** Installing contractors responsible to the Contractor for installation of systems and equipment. This term is inclusive of all trades (HVAC, electrical, plumbing, etc.).
- N. **Systems, Subsystems, Equipment, and Components:** Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.
- M. **Current Facilities Requirements (CFR) and Operations & Maintenance (O&M) Plan:** Collective documentation prepared in the form of a manual to allow easy navigation of its contents. Contents of the manual shall contain the information necessary to operate the building efficiently.
- N. **Systems Manual:** Collective documentation prepared in the form of a manual to allow easy navigation of its contents. Contents of the manual are defined by the Owner with the help of the CxA, and assembled at project close-out. Manual contents may incorporate other close-out documents (e.g. O&M's, Submittals, As-builts, etc.).
- O. **Testing, Adjusting, and Balancing (TAB):** Includes any and all testing, adjusting and balancing as performed by the TAB Subcontractor.

1.4 COMMISSIONING TEAM

- A. **Members Appointed by Contractor and Subcontractor(s):** Individuals, each having the authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated actions. The Commissioning Team shall consist of, but not be limited to, representatives of the Contractor and of each Subcontractor, including project superintendents, installers, suppliers, and specialists deemed appropriate by the CxA.
- B. **Members Appointed by Owner:**
 - 1. The CxA: Owner has engaged the CxA under a separate contract.
 - 2. Representatives of the Owner including facility users and operation and maintenance personnel.

3. Architect and Engineer of Record.
4. Sustainable Consultant

1.5 OWNER'S RESPONSIBILITIES

- A. Owner shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in commissioning process activities including, but not limited to, the following:
1. Training in operation and maintenance of systems, subsystems, and equipment.
 2. Complete the OPR prior to the issue of contractor submittals
 3. When requested, participate in Cx meetings to support the Cx process
 4. Participate, as needed, in the post-occupancy system performance review 10 months into the 12-month warranty period (Enhanced Commissioning Path 1 & 2).
 5. Provide, where applicable, any information and effort needed to support the development of the CRF and O&M plan.
 6. Participate and assist with monitoring-based commissioning activities after occupancy.

1.6 DESIGN TEAM'S RESPONSIBILITIES

- A. Design Team shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in commissioning process activities including, but not limited to, the following:
1. Participate in functional performance testing / deferred or opposite season testing of systems to be commissioned (where applicable based on complexity of system or uniqueness of design).
 2. Assist with issues identified during commissioning. Provide responses to open issues within two weeks of being posted via online web-based tracking database (SES Commissioning Portal).
 3. Participate, as needed, in the post-occupancy system performance review 10 months into the 12-month warranty period.
 4. Provide, where applicable, any information and effort needed to support the development of the CRF and O&M plan.
 5. Provide full support of monitoring-based commissioning activities during configuration and implementation.

1.7 CONTRACTOR'S AND SUBCONTRACTOR'S RESPONSIBILITIES

- A. Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:
1. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
 2. Provide the CxA with a detailed and accurate construction schedule. Coordinate scheduling of commissioning activities with the CxA and include them in the construction schedule.

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3. Provide a submittal log, operation and maintenance data submittals, equipment start-up, and field quality reports.
 4. Provide CxA with copies of all approved change orders, RFIs, ASIs or other modifications impacting construction when approved.
 5. Participate in commissioning field observations.
 6. Confirm accurate and successful completion of construction checkout documents (pre-functional checklists) for all systems to be commissioned prior to verification site visits and functional testing by the CxA.
 7. Certify readiness of systems to be commissioned prior to functional performance testing.
 8. Participate in functional performance testing of systems to be commissioned.
 9. Provide field quality control testing and inspection reports for all systems including envelope systems where called for in individual sections.
 10. Resolving issues identified during commissioning and coordinating correction of deficiencies. Provide responses to open issues within two weeks of being posted via online web-based tracking database (SES Commissioning Portal).
 11. Participate in operation and maintenance planning and verification.
 12. Participate in operation and maintenance training sessions.
 13. Participate in final review at the 10-month post occupancy meeting.
 14. Coordinate Subcontractor participation in commissioning activities.
 15. Assist in coordinating the Subcontractors, as needed, to perform testing of systems and equipment as it relates to project phasing.
 16. Assist in coordinating the Subcontractors, as needed, to perform deferred or opposite seasonal testing of systems and equipment. Assist in coordinating the Subcontractors to resolve issues discovered as a result.
 17. Coordinate the Subcontractors to resolve issues discovered during the system performance review 10 months into the 12-month warranty period.
 18. Provide, where applicable, any information and effort needed to support the development of the CRF and O&M plan
 19. Participate and assist with monitoring-based commissioning activities as needed during configuration and implementation.
- B. Subcontractor(s) shall assign representatives with the expertise and the authority to act on behalf of the entity responsible for installation of systems to be commissioned who shall participate in and perform commissioning team activities including, but not limited to, the following:
1. Provide a submittal log, operation and maintenance data submittals, equipment start-up, and field quality reports.
 2. Provide information to the CxA including, but not limited to:
 - a. Schedule as mentioned above
 - b. Equipment submittals
 - c. Operation and maintenance information submittals
 3. Confirm accurate and successful completion of construction checkout documents (pre-functional checklists) for all systems to be commissioned prior to verification site visits and functional testing by the CxA.
 4. Certify readiness of systems to be commissioned prior to functional performance testing. Provide any available support documentation (start-up reports, pressure test reports, etc.).
 5. Participate in functional performance testing of systems to be commissioned.
 6. Participate in Commissioning meetings.

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7. Provide technicians who are familiar with the construction and operation of the installed systems, are trained in the use of required testing instruments and procedures to participate in testing of installed systems, subsystems and equipment.
 8. Resolving issues identified during commissioning and coordinating correction of deficiencies. Provide responses to open issues within two weeks of being posted via online web-based tracking database (SES Commissioning Portal).
 9. Participate in training sessions for Owner's operation and maintenance personnel.
 10. Participate, as needed, in performing deferred or opposite seasonal testing of systems and equipment.
 11. Participate, as needed, in resolving warranty related issues discovered during the system performance review 10 months into the 12-month warranty period.
 12. Participate and assist with monitoring-based commissioning activities as needed during configuration and implementation.
 13. Provide on-site support, as needed, from equipment manufacturers for testing packaged controls

1.8 COMMISSIONING DOCUMENTATION

- A. Commissioning plan: An informational document, prepared by the CxA, that outlines the schedule, allocation of resources and documentation requirements of the commissioning process, including:
 1. Plan for delivery and review of submittals, CFR and O&M materials, and other documents and reports. Identification of the relationship of these documents to other functions and a description of submittals that are required to support the commissioning processes.
 2. Overview of the organization, layout and content of commissioning documentation and a description of documents to be provided along with identification of responsible parties.
 3. Identification of systems and equipment to be commissioned.
 4. Description of schedules for testing procedures along with identification of parties involved in performing and verifying tests.
 5. Identification of items that must be completed before the next operation can proceed.
 6. Description of responsibilities of commissioning team members.
 7. Description of requirements for operation and maintenance training, including required training materials.
 8. Description of expected performance for systems, subsystems, equipment and controls.
 9. Requirements for documenting changes on a continuous basis to appear in the project record documents.
 10. Process and schedule for completing construction checklists for systems to be commissioned.
 11. Step by step procedures for testing systems, subsystems and equipment with descriptions for methods of verifying relevant data, recording the results obtained and listing parties involved in performing and verifying tests.

- B. Pre-functional Checklists: CxA shall develop pre-functional checklists for each system to be commissioned including all interfaces and interlocks. Separate entries will be provided for each item to be checked. Pre-functional checklists will be completed by the installing Subcontractor and verified by the Contractor and CxA. Space will be provided for sign off of installing Subcontractor, Contractor and CxA. The successful completion of the pre-functional checklists for systems and equipment is mandatory prior to any functional testing being performed. The

successful completion of these checklists without outstanding issues indicates the equipment/systems full readiness for successful functional testing. **Falsely indicating successful completion of the checklists and resulting failures of functional testing will result in the responsible contractor being responsible for the cost of retesting.**

- C. Field Observation Reports: The CxA will issue periodic field observation reports resulting from site visits made throughout construction. The reports will be submitted to the Owner and the Contractor for distribution to the Subcontractor and may include, but are not limited to, the following:
1. Witnessing systems, assemblies, equipment, and component startup.
 2. Cleanliness and proper storage of construction materials like duct work, refrigerant piping, etc.
 3. Observed installation deficiencies and/or deviations from the Contract Documents.
- D. Certificate of Readiness: Certificate of Readiness shall be signed by the Contractor, Subcontractor(s), and Installer(s) certifying that systems, subsystems, equipment, and associated controls are ready for functional performance testing and that all relevant information including submittals and installation data has been submitted. Completed pre-functional checklists signed by the responsible parties shall accompany this certificate. **Falsely indicating readiness and resulting failures of functional testing will result in the responsible contractor being responsible for the cost of retesting.**
- E. Functional Performance Test Procedures: The CxA shall develop functional performance test sheets for each system to be commissioned including interfaces and interlocks. Separate entries will be provided for each item to be tested. CxA shall prepare separate tests for each mode of operation and provide space to indicate whether the mode under test responded as required. All information gathered will be documented by the CxA. Each test will include, but not limited to, the following:
1. Name and identification of each item being checked.
 2. Date of test.
 3. Indication of whether the record is for a first test or retest following correction of a problem or issue.
 4. List of deficiencies.
 5. Calibration of sensors and sensor function.
 6. Testing conditions under which test was conducted, including (where applicable) ambient conditions, setpoints, override conditions, and status and operating conditions that impact the results of the test.
 7. Control sequences for mechanical and electrical systems.
 8. Verification of control signals for each setpoint at specified conditions.
 9. Responses to control signal at specified conditions (where applicable).
 10. Sequence of responses to control signals at specified conditions.
 11. Electrical demand or power input at specified conditions (where applicable).
 12. Expected performance of systems, subsystems and equipment at each step of the tests. Narrative description of observed performance of systems, subsystems and equipment. Notation to indicate whether the observed performance at each step meets the expected results.
 13. Interaction with ancillary equipment.

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- F. Training Plans: To be prepared by the Contractor and Subcontractors and submitted to the CxA and the Owner for review and comment prior to finalizing training plans.
- G. Systems Manual (Enhanced Cx)
1. The CxA shall develop the Systems Manual in accordance with the requirements identified in Divisions 01, and LEED V4.1 guideline (option 1 / path 1) with the help of the contractor and design team. Materials below shall be provided to the CxA as requested for the assembly of this manual. (Enhanced Cx, Manual states the following is “usually” included in the manual adjust as needed for your project)
 - a. Executive Summary
 - b. OPR
 - c. BOD
 - d. System single line diagrams
 - e. Construction & Record Documents
 - f. Approved submittals
 - g. As-built drawings
 - h. As-built Sequence of Operations
 - i. Original Setpoints for all systems commissioned
 - j. Recommended schedule for recommissioning
 - k. Recommended schedule for sensor re-calibration
 - l. O&M manuals
 - m. Equipment preventative maintenance manuals
 - n. Confirmation of completed training for the owner and occupants
 - o. Ongoing system optimization procedures
 - p. Final Cx report
- H. Current Facilities Requirements (CFR) and Operations & Maintenance (O&M) plan. Shall be prepared by the CxA and shall incorporate requirements from the OPR, BOD, and functional testsheets. Information may also be extracted from product submittals and equipment operations and maintenance manuals. The plan will include the following information;
2. Sequence of operations
 3. Building Occupancy Schedule
 4. Equipment runtime schedules
 5. Setpoints for all HVAC equipment
 6. Lighting Levels throughout the building
 7. Minimum OA requirements
 8. Seasonal changes to schedules or setpoints
 9. System narrative describing mechanical and electrical equipment
 10. Cx program that includes periodic Cx requirements, ongoing Cx tasks, and continuous tasks for critical facilities
- I. Commissioning Issues Log: The CxA will document any and all deficiencies and corrective actions taken for systems and equipment that fail initial functional performance tests including required modifications to systems and equipment and revisions to functional performance test procedures. Re-tests and final results will also be documented.
1. Commissioning Notice: CxA prepares and maintains an issue log that describes design, installation and performance issues that are at variance with the OPR, BOD and Contract Documents. Identification and tracking of issues as they are encountered, documenting the

status of unresolved and resolved issues. The issues log is shared with members of the Commissioning team via an interactive web-based portal which is maintained by the CxA.

- a. SES Commissioning Portal: The interactive web-based portal is an on-line database maintained by Sustainable Engineering Solutions, LLC. The portal is used by the CxA to track issues and assign responsibility for corrective action.
- b. All members of the Commissioning Team will be given access to the portal as required to respond to issues or deficiencies. Issues can be sorted based on responsibility, status, date posted and issue tag.
- c. Issues status will begin as “Open” until the responsible Contractor or Subcontractor addresses the issue stating that corrective action has been performed.
- d. Once the Contractor / Subcontractor have addressed the issue stating that corrective action has been performed the issue status will be changed to “Pending Verification” as the issue awaits re-verification by the CxA.
- e. After the CxA has confirmed that the corrective action has taken place, as stated by the responsible Contractor or Subcontractor, the issue status will be indexed to “Closed” but remain visible for record purposes.

1.9 SUBMITTALS BY CONTRACTOR

- A. Information listed below shall be submitted with the product and system product literature and shop drawing submittals for review and approval by the Owner, Architect, Engineer of Record and the CxA. This information will be used to confirm the product compliance with the OPR, BOD and Contract Documents and to establish detailed commissioning requirements and procedures. The information shall be specific to each system to be commissioned and shall be inclusive of all related systems, equipment and components.
- B. The Contractor shall provide the product and equipment submittals in accordance with the requirements identified in Divisions 1 and the specific requirements identified in each Section.
 1.
 - a. Manufacturer’s detailed installation and start-up requirements including equipment checklists for each piece of equipment/assembly.
 - b. Operation instructions.
 - c. Manufacturer’s recommended maintenance and troubleshooting procedures.
 - d. Warranty and owners’ obligations to maintain warranty.
 - e. Detailed product data for each piece of equipment including part load capacities, electrical components and requirements, etc. (As appropriate)
 - f. Performance curves for each piece of equipment being submitted. (As appropriate)
 - g. Coordination and Record Drawings.
 - h. Logic flow diagrams for control systems sequences of operation. Include detailed sections of the Sequence of Operations for related function groups.
 - i. Indicate initial setpoints, reset schedules, sensor locations, etc.
 - j. Detailed test reports resulting from testing of any exterior enclosure (window, door, curtain wall, etc.) mock-ups performed by the installing contractor or third-party entity prior to construction.
- C. Operation and Maintenance Manuals
- D. As-Built Documents

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- E. Training materials
 - F. Start-up & field-testing reports
 - G. Product, equipment, and materials warranties
 - F. The Contractor shall develop the Operation and Maintenance manuals in accordance with the requirements identified in Divisions 1 and the specific requirements identified in each Section.

1.10 COORDINATION

- A. Coordination Meetings: The CxA shall conduct periodic coordination meetings with the Commissioning Team to review progress on the commissioning plan, to discuss scheduling conflicts and to discuss upcoming commissioning process activities.
- B. Pretesting Meetings: The CxA shall conduct pretest meetings with the Commissioning Team prior to the start of the functional performance testing to review start-up reports, pretest verification results, testing procedures, testing personnel and instrumentation requirements and manufacturer's authorized service representative services for each system, subsystem, equipment and component to be tested.
- C. Field Observations: The CxA shall conduct periodic field observations during construction. The Contractor must notify the CxA at least one week prior to completion of key milestones, assemblies and sub-system components installation and functional testing so that site visits can be coordinated while access is available to witness.
- D. Coordination During Functional Performance Testing: The CxA shall coordinate sequence of testing activities to accommodate required quality assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and verification.
- E. Manufacturer's Field Services: The Subcontractor(s) shall be responsible for coordinating services from the manufacturer's representative, technicians or vendors as needed to assist in the functional performance testing. The CxA will coordinate when these services are required and notify the Subcontractor(s) at least one week prior to scheduled functional performance testing.

1.11 ENVELOPE COMMISSIONING (Enhanced Option 2)

- A. Intent: The CxA will work closely with the Owner, design team, and the installing contractors to help establish a level of quality for the envelope systems on the project.
- B. The statement above is accomplished through a review of submittals, project details, manufacturer guidelines and contractor coordination meetings. Once that level of quality is established, the CxA will provide periodic observations of systems throughout construction to help assure ongoing quality. The CxA shall not be considered an inspector nor be responsible to observe every section or application of these systems.
- C. Where deficiencies are observed and reported by the CxA, it is the responsibility of the contractor to not only correct the area of the system reported, but to assure these deficiencies are corrected throughout, prior to being enclosed with the exterior façade or interior finishes. The contractor is

responsible for installing systems and materials in compliance with the project documents and with manufacturers practices.

- D. If the CxA is not notified prior to final assembly then finished sections may have to be disassembled for review at no cost to the owner. Any costs associated with disassembling and re-assembling components shall be borne solely by the contractor.
- E. See section 3.5 for testing requirements.

1.12 SYSTEMS TO BE COMMISSIONED

- A. The following systems, subsystems, equipment and components will be commissioned and will be referred to collectively herein as the Systems to be Commissioned:

- 1. Mechanical (HVAC) Systems
 - a. Building Automation and Direct Digital Controls and system interlocks
 - b. Water Source Heat Pumps
 - c. Geothermal Loop System and Components
 - d. Glycol Makeup Unit(s)
 - e. All Pumps (Hot Water, Chilled Water, Glycol, Geothermal, etc.)
 - f. Air Handling Units
 - g. Chilled and Hot Water Coils
 - h. Energy Recovery Wheels (serving AHUs)
 - i. Energy Recovery Ventilator
 - j. VAV Boxes
 - k. Exhaust Fans
 - l. Garage Ceiling Fans
 - m. Fin Tube Radiation
 - n. Unit Heaters
 - o. Radiant Floor Systems
 - p. Airflow monitoring and controls
 - q. Natural ventilation (Trombe wall dampers and motorized windows)
 - r. Trombe wall heat recovery
 - s. Dashboard programming
 - t. Trending and recording data for Monitoring Based Commissioning
 - u. Alarms per Monitoring Based Commissioning
- 2. Plumbing Systems
 - a. Domestic Water Heating Systems
- 3. Electrical Systems
 - a. Lighting and Lighting Controls
 - b. Security System (intrusion detection and access control)
 - c. Tel/Data
 - d. Photovoltaic System
- 4. Life Safety Systems
 - a. Fire Alarm interface to HVAC equipment
 - b. Fire Protection Systems and Components

- 5. Building Envelope
 - a. Roofing
 - b. Slab-on grade
 - c. Basement walls
 - d. Structural Insulated Panels “SIPs”
 - e. Opaque wall systems “SIPs and conventional”
 - f. Glazed wall systems
 - g. Entrances, soffits, and projections

PART 2 – PRODUCTS

2.1 TEST EQUIPMENT

- A. All standard and non-standard testing equipment required to perform start-up, initial checkout and functional performance testing shall be provided by the Division contractor for the equipment being tested. This includes any equipment, such as ladders or man lifts, necessary to gain access to systems or equipment to be commissioned.
- B. The ATC sub-contractor will be responsible for providing any available software to interface with the automated temperature control system for functional performance testing purposes. If necessary due to licensing restrictions the ATC contractor will be responsible for providing a computer as well to operate the software.
- C. The ATC sub-contractor will be responsible for securing access to any available networks (wireless or local) for use with web-based control systems. The ATC contractor will be responsible for providing user access to the web-based control system for the CxA to facilitate functional performance testing.
- D. The electrical contractor or information technology contractor (the installing contractor) will be responsible for providing optical loss test sets (OLTS) for testing of fiber optic cable where commissioning of telephone or data systems has been included as part of the commissioning scope of work in section 1.12 above.
- E. The electrical contractor or information technology contractor (the installing contractor) will be responsible for providing cable analysis meters for testing of copper where commissioning of telephone or data systems has been included as part of the commissioning scope of work in section 1.12 above.
- F. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance within the tolerances specified in applicable Divisions. The Subcontractor’s instrumentation shall meet the following standards:
 - 1. Be of sufficient quality and accuracy to test and/or measure system performance within the tolerances required to determine adequate performance.
 - 2. Be calibrated on the manufacturer’s recommended intervals with calibration tags permanently affixed to the instrument being used.
 - 3. Be maintained in good repair and operating condition throughout the duration of use on this project.

PART 3 - EXECUTION

3.1 FUNCTIONAL PERFORMANCE TESTING REQUIREMENTS

- A. The requirements identified in this section are applicable to the functional performance testing of all system and equipment to be commissioned.
- B. The objective of functional performance testing is to demonstrate that each system is operating in accordance with the performance identified in the OPR, BOD and Contract Documents through systematic testing and documentation. The intent is to bring the systems from a state of substantial completion to full dynamic operation and documenting the performance. Additionally, during the functional performance testing process, areas of deficient performance are identified and corrected, improving the operation and function of the systems.
- C. The CxA shall achieve this objective by developing individual systems testing procedures which, when executed systematically by the Subcontractor(s), will allow the CxA to observe operation, evaluate performance, identify deficiencies, recommend modifications, adjust, and document the systems and systems equipment performance over a range of load and functional levels.
- D. In general, each system to be commissioned shall be made to operate through all modes of operation where there is a specified system response. Verifying each sequence identified in the Contract Documents is required. Proper responses to such modes and conditions as power failure, freeze condition, low oil pressure, no air or water flow, equipment general failure, etc. shall be tested.

3.2 COORDINATION AND SCHEDULING OF FUNCTIONAL PERFORMANCE TESTING

- A. Scheduling of the Subcontractor(s) and personnel required to execute the functional performance testing is the responsibility of the Contractor.
 - 1. Commissioning activities shall be scheduled by the CxA and forwarded to the Contractor for distribution to the Subcontractors.
 - 2. The Contractor shall be responsible for integrating functional performance testing and commissioning requirements into the master activity schedule.
- B. The Subcontractor(s) shall provide sufficient notice to the CxA regarding their completion schedule for the pre-functional checklists and system start-up of all equipment and systems to be commissioned.
 - 1. Subcontractors are responsible for execution of all tests.
- C. Functional performance testing is conducted after pre-functional checklists and start-up procedures have been satisfactorily completed and documentation has been submitted and approved.
- D. The Contractor shall verify completeness of the exterior enclosure to facilitate the functional performance testing of the various systems and sub system assemblies.

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- E. The Contractor shall verify completeness of the building envelope, perimeter and interior items which affect proper operation and control of HVAC, Plumbing and Electrical equipment and systems.
 - F. The testing, adjusting and balancing of both air and hydronic systems shall be completed and any noted issues addressed before functional performance testing of air and water related equipment or systems. A preliminary report of the TAB Subcontractor's findings shall be submitted prior to the start of functional performance testing.

3.3 SYSTEM START-UP

- A. The Contractor shall confirm that all start-up procedures take place and are documented in accordance with the requirements identified in Divisions 1 and the specific requirements identified in each Section.
- B. The Contractor shall be responsible for coordinating the Subcontractor(s), manufacturer's representatives and certified start-up technicians. The Contractor shall commence with system start-up after approval has been given to the start-up plan and after initial inspections by the Subcontractor(s) have been completed. The CxA shall be notified via a system start-up schedule for witness of system start-up on selected systems to be commissioned.
 - 1. The Subcontractor(s) shall be responsible for submitting system start-up documentation in accordance with the requirements identified in Division 1 and the specific requirements identified in each Section.
 - 2. The Contractor shall take corrective action on all system deficiencies noted in the start-up report and demonstrate to the CxA suitable system operation can be maintained.

3.4 PREREQUISITE FUNCTIONAL TESTING VERIFICATION

- A. The Contractor shall certify that systems to be commissioned have been completed, calibrated and start-up procedures have been completed. The Contractor shall verify that the systems to be commissioned are operating according to the OPR, BOD, and the Contract Documents and the Certificates of Readiness are signed and submitted.
- B. The Contractor shall certify that instrumentation and automated temperature controls associated with the systems to be commissioned have been completed and calibrated and are operating according to the OPR, BOD, and the Contract Documents and that preset set points have been recorded. A copy of the point-to-point checkout and sequence verification documents, resulting from the ATC sub-contractor start-up, shall be provided to the CxA for review.
- C. The Contractor shall certify that the TAB procedures have been completed and that TAB preliminary reports have been submitted, discrepancies corrected, and corrective work approved. The Contractor shall confirm that the equipment interface with monitoring and control system and TAB criteria, and where specified, the calibration of sensors and control devices is fully completed.
- D. The Contractor shall certify that all safety cutouts, alarms and interlocks with smoke control and life safety systems during each mode of operation have been tested, discrepancies corrected, and corrective work approved.

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- E. The Contractor shall confirm that all pre-functional check lists have been completed.

3.5 FUNCTIONAL PERFORMANCE TESTING

- A. The responsible Subcontractor will execute the functional performance testing under the direction of the CxA. The CxA shall observe the functional performance test procedures for all of the sub systems, equipment and components associated with the systems to be commissioned.
- B. Functional performance procedures may be executed by manual adjustment (i.e. manually manipulating the equipment and observe performance) or by monitoring the performance and analyzing the results using the control system's graphic trend log capabilities.
- C. Functional performance test procedures shall be performed using design conditions whenever possible to confirm design performance.
1. If design conditions are not available then the functional performance test procedures shall be performed under conditions that simulate actual conditions to the closest practical approximation.
- D. The Subcontractor executing the functional performance test procedure shall provide all necessary materials, system modifications, etc. to produce the flows, pressures, temperatures, etc. necessary to execute the test under specified conditions.
- E. At completion of the functional performance testing, the Subcontractor executing the functional performance test procedure shall return all affected building equipment and systems to their normal operating condition. Contractor to release any overrides.
- F. The functional test procedures are meant to allow the CxA to observe, evaluate, identify deficiencies, recommend modifications and document the systems and systems equipment performance over a range of load and functional levels. Below is a general list of support topics that may be requested of the contractor/subcontractor to support the Commissioning testing efforts. See section 1.12 for a list of systems to be commissioned, to better clarify expectations. During the construction phase of the project, the CxA will generate functional performance testsheets that will define actual testing measures and rigor of testing:
1. Air & Water Distribution and Exhaust Systems:
- a. The CxA will require the TAB contractor to spot check air and hydronic systems for reported accuracy and/or as relates to the CxA scope of systems. This may include, but will not be limited to readings at registers, diffusers, traverses, pumps, coils, lab systems, building/space pressures, fans, etc.
- b. The CxA may require the TAB contractor to confirm calibration of ATC/HVAC/Plumbing devices which may include, but will not be limited to; Air flow stations, water flow devices, static pressure devices, temperature sensors, pressure devices, fume hood face velocity monitors, etc.
2. Automated Temperature Controls (inclusive of all applicable systems):
- a. The ATC Subcontractor shall demonstrate the proper operation of the specified and/or approved temperature control sequences for each system, sub systems, equipment and components serving the systems to be commissioned.

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- b. In addition to sequence verification, The ATC subcontractor shall demonstrate, but not limited to, the following:
 - 1) Proper display of all ATC graphics.
 - 2) Point-to-point verification and calibration of controls devices (flow stations, thermostats, glycol refractometers, etc.)
 - 3) Point-to-point verification of dampers, actuators, valves, etc.
 - 4) Demonstrate systems reaction and operation when operating on emergency power.

 - 3. Energy Management and Information System (inclusive of all applicable systems):
 - a. The EMIS Subcontractor shall demonstrate the proper operation and configuration of the energy management system
 - b. In addition to configuration verification, the EMIS subcontractor shall demonstrate, but not limited to, the following:
 - 1) Proper display of the EMIS User Interface
 - 2) Point-to-point verification and calibration of meters and sensors
 - 3) Demonstrate proper configuration of the fault detection and diagnostics
 - 4) Report generation

 - 4. Plumbing Systems:
 - a. The plumbing subcontractor shall provide support as requested by the CxA to demonstrate proper operation and control of, but not limited to the domestic water systems, emergency shower/eye wash stations, mixing valves, lab gas, compressed air, or other systems that relate to or integrate with the systems being commissioned.

 - 5. HVAC Systems:

The mechanical subcontractor shall provide support as requested by the CxA to demonstrate proper operation and control of, but not limited to the geothermal heating and cooling system, air handling systems, pumping systems, exhaust systems, laboratory systems, radiant slab systems, Refrigerant based cooling systems, or other systems that relate to or integrate with the systems being commissioned.

 - 6. Electrical Power Systems:
 - a. The electrical subcontractor shall provide support as requested by the CxA to demonstrate proper operation and control of, but not limited to photovoltaic system, emergency power, day lighting, lighting controls, thermal imaging of electrical equipment, switching, or other systems that relate to or integrate with the systems being commissioned.

 - 7. Communications (voice, data, video, etc.) Systems:

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- a. The communication subcontractor shall provide support as requested by the CxA to demonstrate proper operation and control of, but not limited to communication devices, timeclocks, paging systems, public address systems, networking, or other systems that relate to or integrate with the systems being commissioned.
 - b. The communication contractor shall notify the CxA of communication system testing that may be required by division section, or by equipment manufacturer showing integrity of the installed system.
8. Life Safety Systems:
- a. The life safety subcontractor shall provide support as requested by the CxA to demonstrate proper operation and control of, but not limited to fire alarm devices and panels, fire protection temper/flow/pumping devices, security devices, device ring-in and mapping, smoke detection or smoke related systems, or other systems that relate to or integrate with the systems being commissioned
9. Envelope Testing
- a. The various trades that relate to the building envelope (may include but not limited to, division 3, division 6, division 7, division 8 and division 13 if applicable) shall provide support as requested by the CxA to review and confirm proper installation of their materials or systems.
 - b. Testing requirements are outlined in individual sections by the design team, with the help of the CxA and the owner.
 - c. All performance testing of the envelope systems is the responsibility of the division contractor unless otherwise specified. Testing procedures per specified standard (ASTM, AMAA, etc) shall be presented to the CxA for review 2 weeks prior to testing being scheduled. Where envelope testing is provided by the CxA, the contractor shall provide 120 volt power and water at required pressures to within 50 feet of the testing locations. A lift shall also be provided for exterior or interior use as required.
 - d. The CxA is to be given notice of contractor Envelope testing 2 weeks prior to the scheduled date.
10. Problem Solving
- a. The CxA may recommend solutions to problems found, however the burden of responsibilities to solve, correct and retest problems rests with the Contractor, Subcontractor, Architect and Engineering of Record.
11. Trend Logs:
- a. ATC contractor to provide trend logs as requested by the CxA in any format we deem necessary.

3.6 OPPOSITE SEASON/DEFERRED FUNCTIONAL PERFORMANCE TESTING

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- A. The purpose of opposite seasonal functional testing is to evaluate the performance of selected equipment during design weather conditions that may not have been available during the initial functional testing. Ideally cooling equipment needs to be functionally tested under hot, humid summer conditions to review proper operation in accordance with design specifications. The same is true for heating hot water, steam system and humidification systems which require colder, drier, winter climates.
 - B. The purpose of deferred functional performance testing is to evaluate the performance of a selected system that may have been partially complete during the initial functional performance testing of the system's components. Ideally systems need to be functionally tested once completed but, due to project phasing, may be completed at the component level before being completed at the system level.
 - C. The functional performance testing performed during seasonal/deferred testing will adhere to the guidelines listed above in section 3.5 in its entirety of this Section.

3.7 DOCUMENTATION OF COMPLIANCE AND NON-COMPLIANCE

- A. Documentation:
 - 1. The CxA will witness and document the results of the functional performance tests using the specific procedural forms (i.e. functional performance test sheets) developed for that purpose.
 - 2. Recorded information will include measured performance data, visual observations and a comprehensive summary describing the operation of systems at the time of testing.
 - 3. All functional performance test sheets, procedural forms, etc. used to document compliant and non-compliant performance will remain the property of the CxA until the end of the project at which point they will become the property of the Owner.
- B. Compliance
 - 1. The CxA will record the results of the functional performance testing on each specific procedural form. Tests found to be compliant with the testing criteria stated in the procedural form will be identified as such and submitted to the Owner for approval.
 - 2. Where applicable, additional performance information may be recorded for future use or reference by the CxA when developing additional project documentation.
- C. Non- Compliance
 - 1. The CxA will record the results of the functional performance testing on each specific procedural form. Tests found to be non-compliant with the testing criteria stated in the procedural form will be identified as such.
 - 2. Corrections of minor deficiencies identified may be made during the functional performance testing at the discretion of the CxA. In such cases the deficiency and resolution will be documented on the procedure form for record.
 - 3. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures. However, the CxA will not be pressured into overlooking deficient work or loosening acceptance criteria to satisfy scheduling or cost issues, unless there is an overriding reason to do so at the request of the Owner.

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4. Should a deficiency be identified that cannot be readily corrected during the functional performance testing the CxA will notify the installing Contractor or Subcontractor. If there is no dispute regarding the nature of said deficiency then the installing Contractor or Subcontractor accepts the responsibility to correct it.
 - 1) The CxA will document the deficiency, the Contractor or Subcontractor's response and their intentions and proceed to the next functional performance test.
 5. If functional performance tests cannot be completed because of a deficiency outside the scope of the Contractor or Subcontractor responsible for installation of the system or equipment to be commissioned then the deficiency shall be documented and reported to the Owner.
 - 1) The CxA will document the deficiency, the responsible Contractor or Subcontractor's response and their intentions and proceed to the next functional performance test.
 6. After completion of the functional performance testing the CxA will publish all deficiencies through the web-based interactive commissioning database. At this point the deficiencies will be assigned a tag, responsibility and status and be known as "commissioning issues".
 7. If there is any dispute regarding a specific commissioning issue or issues in general; whether the assigned responsibility or the nature of the issue are being disputed then the dispute will be documented and a copy given to the Contractor, Design Team and Owner for evaluation and resolution.
 8. The intent is to make resolutions at the lowest management level possible. Other parties are brought into the discussions as needed. The Owner maintains the final interpretive authority.
 9. Once the interpretation and resolution have been agreed upon by all parties, the appropriate party addresses the commissioning issue and updates the web-based interactive commissioning database indicating corrective action has taken place. The CxA will reschedule the functional performance test and the test will be repeated until satisfactory performance is achieved.
 10. If it is determined that the system is constructed according to the Contract Documents the Owner will decide whether modifications required to bring the performance of the system to the OPR and BOD documents shall be implemented or if the noted performance will be accepted as submitted. If additional work is performed outside of the original project scope then the Owner will decide if functional performance testing shall be repeated and a revised functional performance test sheet submitted.

D. Cost(s) of Re-testing Non-Compliant System or Equipment

1. The cost for the Contractor or Subcontractor to perform re-testing, if they are responsible for the deficiency preventing a successful initial functional performance test, shall be theirs. If they are not responsible, any cost recovery for retesting costs shall be negotiated with the Owner.
2. The cost associated with the time used by the CxA to direct any re-testing required because a specific pre-functional checklist, start-up or commissioning notice issue, reported to have been successfully completed, but determined during functional performance testing to be incomplete, will be back-charged to the Contractor, who may choose to recover costs from the party responsible.

E. Failure Due to Manufacturing Defect

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1. If 10% or a total of three (3), whichever is greater, of pieces of equipment (size alone does not constitute a difference) fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance, all identical units may be considered unacceptable by the CxA. In such case, the responsible Contractor or Subcontractor shall provide the Owner with the following:
 - 1) Within one week of original notification the Contractor or Subcontractor shall coordinate with the vendor and/or manufacturer's representative and shall examine all other identical units making a record of the findings.
 - 2) Within two weeks of the original notification, the Contractor, Subcontractor vendor and manufacturer's representative shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals, training, warranty, etc.
 - 3) The proposed solution shall significantly exceed the specified requirements of the original installation and meet or exceed the performance identified in the Contract Documents.
 - 4) The Owner will determine whether a replacement of all identical units or a repair is acceptable.
 - 5) Two (2) examples of the proposed solution will be provided by the Contractor or Subcontractor and all parties will be allowed to test and review the performance for up to one week, upon which the Owner will decide whether to accept the proposed solution.
 - 6) Upon acceptance of the proposed solution by the Owner, the responsible party shall replace or repair all identical units, at their expense and extend the warranty accordingly, if the original equipment warranty had already begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when replacement parts or units can be obtained.

F. Cost(s) of Re-testing System or Equipment due to Manufacturing Defect

1. The cost for the Contractor or Subcontractor to perform re-testing, if they are responsible for providing the defective equipment, shall be theirs. If they are not responsible, any cost recovery for retesting costs shall be negotiated with the Owner.
2. The cost associated with the time used by the CxA to direct any re-testing required because of defective equipment, will be back-charged to the Contractor.

3.8 OPERATION AND MAINTENANCE TRAINING REQUIREMENTS

A. The Contractor and Subcontractors shall be responsible for coordinating, scheduling and completing operations and maintenance training for the Owners designated personnel on all systems and equipment to be commissioned.

1. All training materials (agenda, hand-outs, etc.) shall be submitted to the CxA for review and approval at least two weeks in advance of scheduled training.
2. Equipment training shall be provided by a factory authorized technical representatives, experienced in training, operation and maintenance procedures for installed systems, subsystems and equipment.
3. All qualifications and certifications of the individual performing the training shall be submitted to the CxA for review and approval at least two weeks in advance of scheduled training.

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4. Each Subcontractor responsible for training will submit a written training plan to the CxA for review and approval at least two weeks in advance of scheduled training. The plan will include field orientation during installation, classroom instruction and field training after the completion of installation and cover the following elements:
 - a. Equipment (to be included in training must include all systems to be commissioned).
 - b. Intended audience (list titles or names)
 - c. Location of training
 - d. Objectives
 - e. Subjects to be covered (i.e. description, special methods, etc.)
 - f. Duration of training on each subject.
 - g. Tracking method to ensure all training is provided.
 - h. Methods of instruction (i.e. classroom lecture, video, site walk-through, actual operational demonstrations, written handouts, etc.)
 - i. Instructor and qualifications
 5. For all major systems and equipment, the ATC subcontractor shall provide a short discussion of the control of the equipment during the mechanical or electrical training conducted by others in addition to formal ATC training on work station operation, graphics, etc.
 6. Subcontractors shall provide all qualified personnel, including manufacturer representatives, vendors, technicians, installing personnel, etc. for equipment and system training.
- B. The CxA will oversee the training of Owner personnel for systems to be commissioned.
1. Training rigor: to be established by Owner and CxA.
 2. In addition to these general requirements, the specific training requirements for Owner personnel are specified in Divisions 1 and the specific requirements identified in each Section.
- C. All training shall meet the requirements per the following outline as follows:
1. General familiarization and operating procedures for each of the building's system installations
 2. Routine maintenance procedures for equipment
 3. Specific operating and maintenance procedures for:
 - a. Mechanical systems
 - b. Electrical systems
 - c. Plumbing systems
 - d. Fire protection/Life safety system
 - e. Direct digital control system
 - f. Envelope system
 4. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to the product.
 - d. Schedule for routine cleaning and maintenance
 - e. Repair instructions
 5. Repair Materials and Sources: Include lists of materials and local sources of materials related services.

6. The number of hours of training desired for the operations and maintenance staff shall be identified as specifics of the building system and equipment are developed.

3.9 EXCLUSIONS

- A. The CxA is not responsible for the following: facilitating construction means or methods, regulating job site safety or providing any other unrelated management function.
- B. The CxA is not responsible for providing Design Engineering services.
- C. The CxA is not responsible for providing installation technician services requiring tools or the use of tools to functionally test, adjust or otherwise bring equipment into a fully operational state. The CxA shall observe technicians as they complete testing and but shall not perform installation or technician services. The Contractor and/or appropriate Subcontractor are responsible for providing all installation technician, vendor or manufacturer representative services as needed to meet the CxA's needs.

3.10 TEMPLATES

- A. Contractors are to complete and sign the Certificate of Readiness for each piece of equipment to be commissioned.

CERTIFICATE OF READINESS

Project Name: DEEP West District Headquarters, Black Rock State Park

As the installing and/or responsible contractor for equipment and systems listed below, I hereby certify that _____ (company name) has performed the required due diligence and has fully installed, inspected, tested these systems/equipment, for the above listed project. I/We also certify that the said systems are fully operational, and are in conformance with the contract documents and are prepared for final acceptance review by the Commissioning Authority (CxA) as outlined in the project Commissioning specification in Division 1. The signatory shall be the responsible contractor/subcontractor for placing the equipment/system into fully operational service.

By signing this certificate of readiness, the contractor/subcontractor hereby acknowledges that:

1. If equipment or systems are found deficient, they will require additional testing efforts by the CxA as well as supporting contractors.
2. By signing this certificate, it is understood that the associated subcontractors (TAB, ATC, etc.) were consulted for compliance prior to signing and said subcontractors also fully acknowledge the equipment/systems full preparedness for final review by the CxA.
3. Where additional testing is required due to deficiencies, all costs associated with the additional testing or re-testing will be the responsibility of the contractor/subcontractor (signatory).

Section I (fill in blanks)

As a representative of _____ (company name) I

_____ (print name) hereby certify that the

_____ (equipment/system) has/have been fully reviewed for

Conformance with the project requirements and the following documents have been provided to the CxA:

Section II (initial each line for compliance, or N/A for reports that are not applicable to this system/equipment)

- 1) Equipment start-up reports. _____
- 2) Completed Pre-functional Checklists. _____

-
- 3) Flushing, cleaning, and pressure testing reports. _____
 - 4) Field quality testing reports including but not limited to; NETA, ASTM, NFPA, etc.. _____
 - 5) Testing, Adjusting, and Balancing (TAB) report. _____
 - 6) ATC Point-to-point compliance sheet. _____

Print name

Company

Signature

Date

END OF SECTION 019113

SECTION 033000 - CAST IN PLACE CONCRETE

PART 1-GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work specified in this section.

1.2 DESCRIPTION OF WORK

- A. The extent of cast-in-place concrete work shown on drawings.
- B. Related work specified elsewhere.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes, specifications and standards, except where more stringent requirements are shown or specified. For the codes and standards listed in this section and in subsequent sections, follow the latest edition recognized by building authority having jurisdiction at the time of construction.
 - 1. "Specifications for Structural Concrete for Buildings", American Concrete Institute, (ACI 301).
 - 2. "Building Code Requirements for Reinforced Concrete", ACI-318
 - 3. Concrete Reinforcing Steel Institute, CRSI, "Manual of Standard Practice"
 - 4. "Standard Specification for Ready-Mixed Concrete" ASTM C 94
- B. Concrete Testing Service: Employ, at Contractor's expense, a testing laboratory acceptable to Engineer to perform material evaluation tests for concrete mix designs and to design concrete mixes.
- C. Materials and installed work may require testing and retesting, as directed by Engineer, at any time during progress of work. Allow free access to material stockpiles and facilities. Tests not specifically indicated to be done at Owner's expense, including retesting of rejected materials and installed work, shall be done at Contractor's expense.
- D. Inspection: The Owner will engage the services of a qualified "Testing Laboratory" for this project. The testing lab, as a representative of the Owner, will provide testing requirements, as necessary.
- E. Sampling and testing for quality assurance during placement of concrete includes the following:
 - 1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

2. Slump: ASTM C 143; one test for each concrete load at point of discharge from truck, and one test for each set of compressive strength test specimens.
3. Air Content: ASTM C 231 one for each set of compressive strength test specimens.
4. Concrete Temperature: Test hourly when air temperature is 40 degrees F. (4 degrees C.) and below, and when 80 degrees F (27 degrees C), and above; and each time a set of compressive test specimens are made.
5. Compression Test Specimen: ASTM C 31; one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field cure test specimens are required.
6. Compressive Strength Tests: ASTM C 39; one set for each 50 cu. yds. or fraction thereof, of each concrete class placed in any one day or for each 5,000 sq. ft. of surface area placed; 1 specimen tested at 7 days, 2 specimens tested at 28 days, and one specimen retained in reserve for later testing if required.

When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.

When strength of field-cured cylinders is less than 85% of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.

- F. Test results will be reported to Engineer and Contractor on same day that tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, name of concrete supplier, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, air content, slump, concrete temperature, compressive breaking strength and type of break for both 7-day tests and 28 day tests.
- G. Additional Tests: The testing service will make additional tests of in place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Engineer. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when concrete placed does not conform to the specified limits of the Contract Documents or when unacceptable concrete is verified.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product data with application and installation instructions for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, joint systems, curing compounds, and others as requested by Engineer.

-
- B. Shop Drawings Reinforcement: Submit shop drawings electronically in PDF format with the ability for reviewers to comment and re-save the file for; fabrication, bending, and placement of concrete reinforcement. Comply with ACI Detailing Manual, Publication SP-66, showing bar schedules, stirrup spacing, diagrams of bent bars, placing plans and wall elevations showing arrangement of concrete reinforcement. Include special reinforcement required and openings through concrete structures. Reproductions of the Engineers Contract Drawings are not acceptable for use as shop drawings.
- C. Certificates of Compliance: Provide the Special Inspector with Certificates of Compliance for welded wire fabric, cement, air-entraining agent, water-reducing agent, water stop, and vapor barrier.
- In addition provide mill test reports for reinforcement bars used for this project.
- D. Laboratory Test Reports: Submit for review laboratory test reports for concrete materials and mix design test as specified.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Unless otherwise indicated, construct formwork for exposed concrete surfaces with plywood, metal, metal-framed plywood faced or other acceptable panel-type materials, to provide continuous, straight, smooth exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient thickness to withstand pressure of newly-place concrete without bow or deflection.
- B. Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.
- C. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces, or prevent bonding for architectural finishes.

2.2 REINFORCING MATERIALS

- A. Reinforcing Bars (Rebar): ASTM A 615-82 (S1), Grade 60, deformed.
- B. Steel Wire: ASTM A 82-79, plain, cold-drawn, steel.
- C. Welded Wire Fabric (WWF): ASTM A 185-79, welded steel wire fabric.
- D. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use bar type supports complying with CRSI recommendations, unless otherwise acceptable.

1. For slabs on grade, provide chairs with sufficient bearing surface to not sink into bearing material or to puncture vapor barrier. Use of stone, clay brick, or concrete brick is NOT acceptable.

2.3 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I, unless otherwise acceptable to the Architect. Use one brand of cement throughout project, unless acceptable to Engineer.
- B. All mixes shall contain a min of 30% (by weight of cementitious material) of pozzolans.
- C. Normal Weight Aggregates: ASTM C 33 and as herein specified. Provide aggregates from a single source for exposed concrete.
- D. Water: Potable.
- E. Air-Entraining Admixture: ASTM C 260.
- F. Water-Reducing Admixture: ASTM C 494, Type A and not containing more chloride ions than are present in municipal drinking water.

2.4 RELATED MATERIALS

- A. Vapor Barrier: Provide tear resistant vapor barrier cover over prepared base material. Vapor barrier shall be 15mil ASTM E 1745 Class A with a permeance below 0.01 perms. All joints to be lapped six inches and sealed with –manufacturer’s tape. Continue vapor barrier up all adjacent vertical surfaces and seal around all penetrations per the manufacturer’s recommendations. Patch any punctures or tears in material with tape or by taping additional vapor barrier material over the damaged area.
 1. Products may be -Stego Wrap Vapor Barrier (15mil) by Stego Industries or approved equivalent.
- B. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
 1. Waterproof paper.
 2. Polyethylene film.
 3. Polyethylene-coated burlap.
 4. Membrane-Forming Curing Compound: ASTM C 309, Type I unless other type acceptable to Engineer. Ensure that curing compound is chemically compatible with hardeners, surface treatments and finish coatings that will be used.

2.5 PROPORTIONING AND DESIGN OF MIXES:

- A. Prepare design mixes for each type and strength of concrete in accordance with ACI 301

Section 3.9 "Proportioning on the Basis of Previous Field Experience or Trial Mixtures", as indicated on drawings.

Use an independent testing facility acceptable to Engineer for preparing and reporting proposed mix design. The testing facility shall not be the same as used for field quality assurance testing unless otherwise acceptable to Engineer.

- B. Submit written reports to Engineer for each proposed mix for each class of concrete AT LEAST 15 DAYS PRIOR TO START OF WORK. Do not begin concrete production until mixes have been reviewed and approved by Engineer.
- C. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job condition, weather, test results, or other circumstances warrant; at no additional cost to Owner and as accepted by Engineer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Engineer before using in work. Submit adjusted concrete mixes to the Engineer for review AT LEAST 5 WORKING DAYS PRIOR TO USE.
- D. Use air-entraining admixture in all concrete exposed to freeze – thaw cycles. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having air content within specified limits.
 - 1. Concrete structures and slabs exposed to freezing and thawing or subject to hydraulic pressure:
 - 3 1/2% to 4 1/2% for maximum 2" aggregate
 - 5 1/2% to 6 1/2% for maximum 3/4" aggregate
 - 6 1/2% to 7 1/2% for maximum 1/2" aggregate
 - 2. Other Concrete: 2% to 4%.
- E. Slump Limits: The concrete shall be proportioned and produced to have a slump of 4 inches or less if consolidation is to be by vibration, and 5 inches or less if consolidation is to be by methods other than vibration. A tolerance up to 1 inch above the maximum indicated shall be allowed for one batch in any five consecutive batches tested. Concrete of lower slump may be used provided it is properly placed and consolidated.
- F. Do not use admixtures containing calcium chloride

2.6 CONCRETE MIXING

- A. Ready-Mix Concrete: Comply with requirements of ASTM C 94 "Standard Specification for Ready-Mixed Concrete", and as herein specified.

Addition of water to the batch will not be permitted.

When air temperature is between 85 degrees F (30 degrees C) and 90 degrees F (32 degrees C), reduce mixing, delivery, and placement time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 degrees F (32 degrees C), reduce time to 60 minutes.

When placement of concrete is likely to occur with air temperatures above 85 degrees F, submit a Hot Weather Concreting Plan to the Engineer for review and approval prior to beginning work. Hot Weather Concreting Plan should comply with ACI 305R.

When placement of concrete is likely to occur with air temperatures below 40 degrees F, submit a Cold Weather Concreting plan to the Engineer for review and approval prior to beginning work. Cold Weather Concreting Plan should comply with ACI 306R.

PART 3 - EXECUTION

3.1 FORMS

- A. Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structures. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position. The Contractor is solely responsible for the safe design and installation of formwork and supports.
- B. Design Formwork to be readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials.
- C. Construct forms complying with ACI 347, "Recommended Practice for Concrete Formwork", to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.
- D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.
- E. Provide temporary openings where interior area of formwork is inaccessible for clean out, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.
- F. Chamfer exposed corners and edges unless otherwise specified, using wood, metal PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- G. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal.
 - 1. Unless otherwise indicated, provide ties so portion remaining within concrete after

removal is at least 1-1/2" inside concrete.

2. Unless otherwise shown, provide form ties which will not leave holes larger than 1" diameter in concrete surface.
- H. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.
- I. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Re-tighten forms and bracing after concrete placement if required to eliminate mortar leaks and maintain proper alignment.

3.2 PLACING REINFORCEMENT

- A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.
- B. Clean reinforcement of loose rust and mill scale, old concrete, earth, ice, and other materials, which reduce or destroy bond with concrete.
- C. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required. Concrete bricks are NOT acceptable.
- D. Place reinforcement to obtain at least minimum coverages indicated on the Contract drawings for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces. All reinforcement must be completely supported and secured against possible displacement prior to placing concrete in any portion of the scheduled placement.
- E. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lap splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.
- F. Concrete reinforcement shall be erected from shop drawings displaying the Engineer's stamp of acceptance only. In the event a conflict exists between the accepted shop drawing and the Contract Documents the conflict shall be brought to the immediate attention of the Engineer for resolution.

3.3 JOINTS

- A. Construction Joints: Locate and install construction joints, which are not shown on drawings, so as not to impair strength and appearance of the structure, as acceptable to Engineer.
- B. Provide keyways at least 1-1/2" deep in construction joints in walls, slabs, and between walls

and footings; accepted bulkheads designed for this purpose may be used for slabs.

- C. Place construction joints perpendicular to the main reinforcement. Continue reinforcement across construction joints.
- D. Isolation Joints in Slabs-on-Ground: Construct isolation joints in slabs-on-ground at points of contact between slabs on ground and vertical surfaces, such as column pedestals, foundation walls, grade beams and elsewhere as indicated.

Joint filler and sealant materials are specified in Division 7.

- E. Control Joints in Slabs-on-Ground: Construct control joints in slabs-on-ground to form panels or patterns as shown. Use inserts or saw-cut 1/4" wide x 1/5 to 1/4 of the slab depth, unless otherwise indicated.

3.4 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instruction and directions provided by suppliers of items to be attached thereto.
- B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

3.5 PREPARATION OF FORM SURFACES

- A. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.
- B. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

3.6 CONCRETE PLACEMENT

- A. Preplacement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work. Cooperate with other trades in setting such work.
- B. Notify testing/inspection agency of intent to place concrete at least 48 hours prior to placement. Perform complete preplacement inspection of formwork, reinforcement and condition of base prior to arrival of inspector. For each placement Contractor will provide the Special Inspector with a written record of the quality control inspection performed by and signed by the Contractor.
- C. Coordinate the installation of joint materials and vapor barriers with placement of forms and

reinforcing steel.

- D. General: Comply with ACI 304, "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete", and as herein specified. Deposit concrete continuously or in layers of such thickness that concrete will not be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.
- E. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
- F. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.
- G. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion; limit duration of vibration to time necessary to consolidate without causing segregation of mix.
- H. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
- I. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
- J. Bring slab surfaces to correct level with straightedge and strike off. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
- K. Maintain reinforcing in proper position during concrete placement operations.
- L. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306, "Recommended Practice for Cold Weather Concreting" and as herein specified.
 - 1. When air temperature has fallen to or is expected to fall below 40 degrees F (4 degrees C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F (10 degrees C, and not more than 80 degrees F (27 degrees C) at time of placement.
- M. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
- N. Do not use calcium chloride, salt and other materials containing anti-freeze agents or chemical accelerators, unless otherwise accepted in mix designs.

- O. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 "Recommended Practice for Hot Weather Concreting", and as herein stated.
 - 1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F (32 degrees C). Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing.
- P. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
- Q. Wet forms thoroughly before placing concrete.
- R. Do not use retarding admixtures unless otherwise accepted in mix designs.

3.7 FINISH OF SURFACES

- A. Rough Form Finish (RfFm-Fn): For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.
- B. Smooth Form Finish (SmFm-Fn): For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material applied directly to concrete, such as waterproofing, damp-proofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.
- C. Smooth-Rubbed Finish (SmRbd-Fn): Provide smooth rubbed finish (SmRbd-Fn) to scheduled concrete surfaces exposed to-view, which have received smooth form finish (SmFm-Fn) treatment, not later than one day after form removal. Moisten concrete surfaces and rub with Carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.
- D. Related Unformed Surfaces: At tops of walls, horizontal offset surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent formed surfaces, unless otherwise indicated.

3.8 MONOLITHIC SLAB FINISHES

- A. Scratch Finish (Scr-Fn): Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tiles, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and as otherwise indicated.

After placing slabs, plane surface to a tolerance not exceeding 1/4" in 2'-0" when tested with a

2' straightedge. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set, with stiff brushes, brooms or rakes.

- B. Floated Finish (Flt-Fn): Apply floated finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated.

After screeding and consolidating concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power driven floats, or both. Consolidate surface with power driven floats, or by hand- floating if area is small or inaccessible to power units. Check and level surface plane to a tolerance not exceeding 1/4" in 10" when testing with a 10' straight edge. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth granular texture.

- C. Troweled Finish (Tr-Fn): Apply troweled finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, paint or other thin film finish coating system.

After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling, with a steel trowel, when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand troweling operation, free of trowel marks, uniform in texture and appearance, and with a surface plane tolerance not exceeding 1/8" in 10', except for concrete on metal deck shall not exceed 1/4" in 10' when testing with a 10' straight edge.

- D. Light Broom Finish: Apply light broom finish to platforms, steps, landings, and for exterior or interior pedestrian ramps. After completion of float finishing, lightly draw broom over concrete surface and apply chemical-hardener finish at platform as specified above.

3.9 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing.

Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.

- B. Curing Methods: Perform curing of concrete by moist curing, by
1. Keep concrete surface continuously wet by covering with water.
 2. Continuous water-Fog Spray.

Surfaces shall be kept continuously moist for not less than 72 hours after finishing.

3. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.

Surfaces shall be kept continuously moist for not less than 72 hours after finishing.

C. Provide moisture-cover curing as follows:

1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

D. Provide membrane curing to slabs as follows:

1. Apply membrane-forming curing compound to concrete surfaces as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Re-coat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
2. Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring, painting, and other coatings and finish materials, unless otherwise acceptable to Engineer.

E. Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. IF FORMS ARE REMOVED, CONTINUE CURING BY METHODS SPECIFIED ABOVE AS APPLICABLE.

F. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.

3.10 REMOVAL OF FORMS

- A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 degrees for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as beam soffits, joints, slabs and other structural elements, may not be removed in less than 14 days and until concrete has attained design minimum compressive strength of 28-days. Determine potential compressive strength of in place concrete by testing field-cured specimens representative of concrete location or members.
- C. Form facing material may be removed 4 days after placement, only if shores and other vertical

supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

- D. Early removal of formwork may be permitted as acceptable to the Engineer provided sufficient data is presented indicating that concrete has attained adequate strength and stiffness to resist anticipated loads without damage. Additional tests to determine early strength and stiffness shall be performed AT THE EXPENSE OF THE CONTRACTOR.

3.11 RE-USE OF FORMS

- A. Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.
- B. When forms are extended for successive concrete placement, thoroughly clean surface, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Architect.

3.12 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Engineer.
- B. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete, but in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Before placing cement mortar or proprietary agent, brush-coat the area to be patched with neat cement grout or proprietary bonding agent.
- C. For exposed-to-view surfaces, blend white portland cement and standard portland cement so that when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixtures and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surfaces.
- D. Repair of formed Surfaces: Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.
- E. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.
- F. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness, using a template having required slope.
- G. Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.

- H. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.
- I. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Engineer.
- J. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete and brush with a neat cement grout, or apply concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.
- K. Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and brush with neat cement grout, or apply concrete bonding agent. Mix dry-pack, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.
- L. Use epoxy-based mortar, approved by the Engineer, for structural repairs. Structural repairs include, but are not limited to, areas of unsound (honeycombed or spalled) concrete with a surface area greater than 9 square inches and/or with a depth greater than 1.5 inches, areas where reinforcement is exposed or areas with cracks greater than 1/16 inch in width. All areas requiring a structural patch shall be approved by the Engineer prior to commencing patching operations.

END OF SECTION 033000

SECTION 033300 - ARCHITECTURAL CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Cast-in-place architectural concrete, including form facings and concrete finishes for Trombe Wall.

B. Related Work Specified Elsewhere:

1. Section 017419 - Construction and Demolition Waste Management and Disposal
2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
4. Requirements in Section 033000 "Cast-in-Place Concrete" apply to this Section.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 DEFINITIONS

- A. Aggregate Exposure: Projection of coarse aggregate from matrix or mortar after completion of exposure operations.

- B. Cast-in-Place Architectural Concrete: Concrete that is exposed to view, is designated as architectural concrete, and that requires special concrete materials, formwork, placement, or finishes to obtain specified architectural appearance.
- C. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
- D. Design Reference: Description of wall finish that reflects acceptable surface quality and appearance of cast-in-place architectural concrete.
- E. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Require representatives of each entity directly concerned with cast-in-place architectural concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Cast-in-place architectural concrete Subcontractor.
 - 2. Review the following:
 - a. Special inspection and testing and inspecting agency procedures for field quality control.
 - b. Construction joints, control joints, isolation joints, and joint-filler strips.
 - c. Reinforcement accessory installation.
 - d. Cold- and hot-weather concreting procedures.
 - e. Concrete finishes and finishing.
 - f. Curing procedures.
 - g. Forms and form-removal limitations.
 - h. Shoring and reshoring procedures.
 - i. Concrete repair procedures.
 - j. Protection of cast-in-place architectural concrete.
 - k. Initial curing and field curing of field test cylinders (ASTM C31/C31M).
 - l. Protection of field-cured field test cylinders.

1.6 ACTION SUBMITTALS

- A. Product Data: For each of the following:
 - 1. Form-facing boards (furnished by Owner and Installed by Contractor).
 - 2. Wood sealer.
 - 3. Form-release agent.

4. Surface retarder.
5. Form ties.

B. Sustainable Design Submittals:

1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
2. Chain of Custody: Provide affidavit confirming wood products sourced through CT Department of Energy and Environmental Protection's Portland, CT Mill have been received and are the products used for this project.

C. Shop Drawings:

1. Formwork: Prepared by, and signed and sealed by, a qualified professional engineer responsible for their preparation, detailing fabrication, assembly, and support of forms.
 - a. Show formwork construction, including form-liner layout, form-liner termination details, dimensioned locations of form-facing material joints, rustications, construction and contraction joints, form-tie locations and patterns, inserts and embedments, cutouts, cleanout panels, and other items that visually affect cast-in-place architectural concrete.
 - 1) Included separate layout for formwork used in mockups.
 - 2) Indicate proposed schedule and sequence of stripping of forms, shoring removal, and reshoring installation and removal.
 - 3) Location of construction joints is subject to approval of Architect.

D. Samples: For each of the following materials:

1. Form-facing boards.
2. Form ties.
3. Exposed aggregates.
4. Chamfers and rustications.

E. Placement Schedule: Submit before start of placement operations.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For the following:

1. Installer: Include copies of applicable ACI certificates.
2. Ready-mixed concrete manufacturer.

B. Material Certificates: For each of the following:

1. Form materials and form-release agents.
 2. Repair materials.
- C. Research Reports: For concrete admixtures in accordance with ICC AC198.
- D. Preconstruction Test Reports: For each mix design.
- E. Concrete Repair: Submit a written, detailed description of materials, methods, equipment, and sequence of operations to be used for repairing architectural concrete, including protection of surrounding materials and Project site. Do not implement any repair without the approval of the Architect.
1. If materials and methods other than those indicated are proposed for any repairs to architectural concrete, add a written description of such materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project and Installer's ability to use such materials and methods properly. Do not implement any repair without the approval of the Architect.
- F. Minutes of preinstallation conference.

1.8 QUALITY ASSURANCE

- A. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- B. Installer Qualifications: An experienced cast-in-place architectural concrete installer, as evidenced by not less than five consecutive years' experience, specializing in installing cast-in-place architectural concrete similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
1. Provide written evidence of qualifications and experience.
 2. Include locations, descriptions, and photographs of completed projects, including name of architect, substantiating the quality of the installer's experience.
- C. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated and employing an ACI-certified Concrete Quality Technical Manager.
1. Personnel performing laboratory tests shall be an ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Level I.
 2. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Level II.

- D. Field Sample Panels: Before casting architectural concrete, produce field sample panel to demonstrate the approved range of selections made under Sample submittals. Produce a full-scale panel, cast vertically, approximately 48 by 48 by 6 inches minimum, to demonstrate the expected range of finish, color, and texture variations.
1. Locate panel as directed by Architect.
 2. Demonstrate methods of curing, aggregate exposure, wood sealers, and coatings, as applicable.
 3. In presence of Architect, damage part of an exposed-face surface for each finish, color, and texture, and demonstrate materials and techniques proposed for repair of tie holes and surface blemishes to match adjacent undamaged surfaces.
 4. Maintain field sample panels during construction in an undisturbed condition as a standard for judging the completed Work.
 5. Demolish and remove field sample panels when directed.
- E. Mockups: Before casting architectural concrete, build mockups, using the same procedures, equipment, materials, finishing procedures, and curing procedures that will be used for producing architectural concrete, to verify selections made under Sample submittals and to demonstrate typical joints, surface finish, color, texture, tolerances, and standard of workmanship. Build mockups to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in the location a foundation wall that will not be exposed to view in the finished project or as approved by Architect.
 2. Build mockups of typical wall of cast-in-place architectural concrete as shown on Drawings, including vertical and horizontal rustication joints, and any sculptured features.
 3. Construct mockups to include at least two lifts having heights equal to those anticipated for construction.
 4. Demonstrate curing, cleaning, and protecting of cast-in-place architectural concrete, finishes, and contraction joints, as applicable.
 5. In presence of Architect, damage part of the exposed-face surface for each finish, color, and texture, and demonstrate materials and techniques proposed for repair to match adjacent undamaged surfaces.
 6. In presence of Architect, demonstrate materials and techniques proposed for repair of tie holes and surface blemishes to match adjacent undamaged surfaces.
 7. Obtain Architect's approval of mockups before casting architectural concrete.
 8. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ASTM C94/C94M and ACI 301.

1.10 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with Section 033000 "Cast-in-Place Concrete."

- B. Hot-Weather Placement: Comply with Section 033000 "Cast-in-Place Concrete."

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 CONCRETE, GENERAL

- A. Comply with ACI 301 and Section 033000 "Cast-in-Place Concrete", unless modified by requirements in the Contract Documents.

2.3 FORM-FACING MATERIALS

- A. Source Limitations: Form-facing material shall be 1 x 8, rough-sawn pine boards furnished by CT DEEP, Portland Mill, in random lengths. Contractor shall unload boards at project site and take possession of material for use as form-facing boards.
- B. Form-facing Boards: Prepare and install Owner-provided form-facing boards. Use water-based liquid-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent surface treatments and finishes of concrete.
- C. Rustication Strips: Dressed wood with sides beveled and back kerfed; nonstaining; in longest practicable lengths. Rustication Strips shall be furnished and installed by Contractor.
- D. Chamfer Strips: Metal or dressed wood, 3/4 by 3/4 inch, minimum; 1 1/4" x 1 1/4" maximum, nonstaining; in longest practicable lengths. Chamfer Strips to be furnished and installed by Contractor.
- E. Form Joint Tape: Compressible foam tape; pressure sensitive; AAMA 800; minimum 1/4 inch thick. Do not tape joints of board forms in contact with finish face of concrete.
- F. Form Joint Sealant: Elastomeric sealant complying with ASTM C920, Type M or Type S, Grade NS, that adheres to form joint substrates, does not stain, does not adversely affect concrete surfaces, and does not impair subsequent treatments and finishes of concrete surfaces. Do not seal joints of board forms in contact with finish face of concrete.
- G. Wood Sealer: Penetrating, clear, water-based polyurethane wood sealer formulated to reduce absorption of bleed water and prevent migration of set-retarding chemicals from wood and does not stain, does not adversely affect concrete surfaces, and does not impair subsequent treatments and finishes of concrete surfaces.

- H. Form-Release Agent: Commercially formulated, colorless form-release agent that does not bond with, stain, or adversely affect architectural concrete surfaces and will not impair subsequent treatments and finishes of architectural concrete surfaces.
- I. Surface Retarder: Water-soluble chemical liquid set retarder, for application on form-facing materials, capable of temporarily delaying final hardening of newly placed architectural concrete surface to depth of aggregate exposure specified.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. BASF Corporation.
 - b. Euclid Chemical Company (The); an RPM company.
 - c. W.R. Meadows, Inc.
 - 2. Source Limitations: Obtain surface retarder from single source from single manufacturer.
- J. Form Ties: Factory-fabricated, removable ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish ties with tapered tie cone spreaders that, when removed, will leave holes no larger than 1 inch in diameter on architectural concrete surface.

2.4 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire fabric in place.
 - 1. Manufacture bar supports in accordance with CRSI's "Manual of Standard Practice."

2.5 CONCRETE MATERIALS

- A. Comply with ACI 301 and Section 033000 "Cast-in-Place Concrete", unless modified by requirements in the Contract Documents.

2.6 CURING MATERIALS

- A. Comply with Section 0330000 "Cast-in-Place Concrete."

2.7 REPAIR MATERIALS

- A. Bonding Agent: ASTM C1059/C1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.

- B. Epoxy Bonding Adhesive: ASTM C881/C881M two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade and class to suit requirements.
 - 1. Types I and II, non-load bearing and Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.8 CONCRETE MIXTURES, GENERAL

- A. Obtain each color, size, type, and variety of concrete mixture from single manufacturer with resources to provide cast-in-place architectural concrete of consistent quality in appearance and physical properties.
- B. Prepare design mixtures in accordance with ACI 301 and Section 033000 "Cast-in-Place Concrete", unless modified by requirements in the Contract Documents.

PART 3 - EXECUTION

3.1 INSTALLATION OF FORMWORK

- A. Comply with Section 033000 "Cast-in-Place Concrete" for formwork, embedded items, and shoring and reshoring, and as specified in this Section.
- B. Construct forms to result in cast-in-place architectural concrete that complies with ACI 117.
- C. Seal form joints, chamfers, rustication joints, and penetrations at form ties with form joint tape or form joint sealant to prevent cement paste leakage at concrete form, but not at face of boards in contact with concrete.
- D. Do not chamfer exterior corners and edges of cast-in-place architectural concrete, except as indicated.
- E. Coat contact surfaces of wood rustications and chamfer strips with wood sealer before placing reinforcement, anchoring devices, and embedded items.
- F. Coat contact surfaces of forms with form-release agent, in accordance with manufacturer's written instructions, before placing reinforcement, anchoring devices, and embedded items.
- G. Coat contact surfaces of forms with surface retarder, in accordance with manufacturer's written instructions, before placing reinforcement, anchoring devices, and embedded items.
- H. Place form-facing boards accurately to provide finished surface texture indicated.
 - 1. Provide solid backing and attach securely to prevent deflection and maintain stability of liners during concreting.
 - 2. Secure form liners in place using fasteners that will not transfer impressions onto surface of concrete.

3. Prevent form liners from sagging and stretching in hot weather.
4. Coat form liner with form-release agent.

3.2 INSTALLATION OF REINFORCEMENT AND ACCESSORIES

- A. Comply with Section 033000 "Cast-in-Place Concrete" for fabricating and installing steel reinforcement and accessories.

3.3 REMOVING AND REUSING FORMS

- A. Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.
 1. Schedule form removal to maintain surface appearance that matches approved design reference, sample panel and mockup.
 2. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
 3. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
 4. Cut off and grind glass-fiber-reinforced plastic form ties flush with surface of concrete.
- B. Clean and repair surfaces of forms to be reused in the Work.
 1. Split, frayed, delaminated, or otherwise damaged form-facing material are unacceptable for exposed surfaces.
 2. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints.
 1. Align and secure joints to avoid offsets.
 2. Do not use patched forms for cast-in-place architectural concrete surfaces.
- D. Removed boards used as liners shall become the property of the Contractor and shall be removed from the site in a lawful manner.

3.4 JOINTS

- A. Construction Joints: Install construction joints true to line, with faces perpendicular to surface plane of cast-in-place architectural concrete, so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated.

2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete. Align construction joint within rustications attached to form-facing material.
3. Locate horizontal joints in walls as indicated.
4. Space vertical joints in walls as indicated on Drawings.
5. Use bonding agent or epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces. Do not install any repair products without Architect's approval.

- B. Contraction Joints: Form weakened-plane contraction joints true to line, with faces perpendicular to surface plane of cast-in-place architectural concrete, so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.

3.5 CONCRETE PLACEMENT

- A. Comply with Section 033000 "Cast-in-Place Concrete."

3.6 FINISHING FORMED SURFACES

- A. Architectural Concrete Finish: Match Architect's design reference sample, identified and described as indicated, to satisfaction of Architect.
- B. Form-Liner Finish: Produce a board-formed, as-cast textured surface free of pockets, streaks, and honeycombs, and of uniform appearance, color, and texture.
- C. Maintain uniformity of architectural concrete finishes over construction joints unless otherwise indicated.

3.7 CONCRETE CURING

- A. Comply with Section 033000 "Cast-in-Place Concrete" using identical curing procedures to that used for field sample panel and mockup.

3.8 REPAIR

- A. Comply with ACI 301.
- B. Repair damaged finished surfaces of cast-in-place architectural concrete when repairing is approved by Architect.
- C. Remove and replace cast-in-place architectural concrete that cannot be repaired to Architect's approval.

3.9 FIELD QUALITY CONTROL

- A. Comply with Section 033000 "Cast-in-Place Concrete."

3.10 CLEANING

- A. Clean cast-in-place architectural concrete surfaces after finish treatment to remove stains, markings, dust, and debris.
- B. Wash and rinse surfaces in accordance with concrete finish applicator's written instructions.
 - 1. Protect other Work from staining or damage due to cleaning operations.
 - 2. Do not use cleaning materials or processes that could change the appearance of cast-in-place architectural concrete finishes.

3.11 PROTECTION

- A. Protect corners, edges, and surfaces of cast-in-place architectural concrete from damage; use guards and barricades.
- B. Protect cast-in-place architectural concrete from staining, laitance, and contamination during remainder of construction period.

3.12 FINAL ACCEPTANCE

- A. Final acceptance of completed architectural concrete Work will be determined by Architect by comparing approved design reference, field sample panel and mockups with installed Work, when viewed at a distance of 8 feet.

END OF SECTION 033300

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SECTION 033543 - POLISHED CONCRETE FINISHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Polished concrete finishing, including staining and scoring.
2. Concrete for polished concrete, including concrete materials, mixture design, placement procedures, initial finishing, and curing is specified in Section 033000 "Cast-in-Place Concrete."

B. Related Requirements:

1. Section 017419 - Construction and Demolition Waste Management and Disposal
2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
4. Section 033000 "Cast-in-Place Concrete" for concrete requirements.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 DEFINITIONS

- A. Design Reference Sample: Sample designated by Architect in the Contract Documents that reflects acceptable surface quality and appearance of polished concrete.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with polished concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Cast-in-place concrete subcontractor.
 - e. Polished concrete finishing Subcontractor.
 - 2. Review cold- and hot-weather concreting procedures, curing procedures, construction joints, concrete repair procedures, concrete finishing, and protection of polished concrete.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
 - 2. Laboratory Test Reports: For stains and liquid floor treatments, indicating compliance with requirements for low-emitting materials.
- C. Polishing Schedule: Submit plan showing polished concrete surfaces and schedule of polishing operations for each area of polished concrete before start of polishing operations. Include locations of all joints, including construction joints.
- D. Samples for Initial Selection: For each type of product requiring color selection.
- E. Samples for Verification: For each type of exposed color.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Material Certificates: For each of the following, signed by manufacturers:
 - 1. Repair materials.
 - 2. Stain materials.
 - 3. Liquid floor treatments.

1.8 QUALITY ASSURANCE

- A. Field Sample Panels: After approval of verification sample and before casting concrete, produce field sample panels to demonstrate the approved range of selections made under Sample submittals. Produce a minimum of three sets of full-scale panels, approximately 48 by 48 inches minimum, to demonstrate the expected range of finish, color, and appearance variations.
 - 1. Locate panels as indicated or, if not indicated, as directed by Architect.
 - 2. Maintain field sample panels during construction in an undisturbed condition as a standard for judging the completed Work.
 - 3. Demolish and remove field sample panels when directed.

- B. Mockups: Before casting concrete, build mockups to verify selections made under Sample submittals and to demonstrate typical joints, surface finish, tolerances, and standard of workmanship. Build mockups to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups in a location not scheduled to be polished, such as a mechanical room or carpeted office or as approved by Architect.
 - 2. Demonstrate curing, finishing, and protecting of polished concrete.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 FIELD CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 STAIN MATERIALS

- A. Penetrating Stain: Water-based, acrylic latex, penetrating stain with colorfast pigments.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide PROSOCO Inc.; Consolideck GemTone Stain or a comparable product by one of the following:
 - a. Americrete, Inc.
 - b. Bomanite Co.
 - c. Scofield, a Business Unit of Sika Corporation.

2. Verify products comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
3. Recipient of Scientific Certification System (SCS) Indoor Air Quality Gold Certification.
4. Living Building Challenge Red List Compliant.
5. Registered as an approved NSF International/Nonfood Compound Registration.
6. Abrasion Resistance: Greater than 50 percent improvement over untreated samples when tested in accordance with ASTM C 1353.
7. Achieve "High Traction Range" readings when tested in accordance with ANSI B101.1.
8. Coefficient of friction: Greater than 0.60 dry, Greater than 0.60 wet when tested in accordance with ASTM C 1028.
9. Adhesion: Greater than 10 percent increase in pull-off strength when compared to an untreated sample when tested in accordance with ASTM D 4541.
10. Water Vapor Transmission: 100 percent retained when compared to untreated samples when tested in accordance with ASTM E 96.96M Method B (Water Method).
11. UV Stability: No degradation or yellowing of material when tested in accordance with ASTM G 154.

2.3 LIQUID FLOOR TREATMENTS

- A. Penetrating Densifier for Polished Concrete Finish: Clear, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; that penetrates, hardens, and is suitable for polished concrete surfaces.
1. Basis-of-Design Product: Subject to compliance with requirements, provide PROSOCO inc., Consolideck LS or comparable product by one of the following:
 - a. Americrete, Inc.
 - b. Bomanite Co.
 - c. Scofield, a Business Unit of Sika Corporation.
 2. Performance Requirements:
 - a. Products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
 - b. Recipient of Scientific Certification System (SCS) Indoor Air Quality Gold Certification.
 - c. Comply with national, state, and district AIM VOC regulations and contain 50 g/l or less.
 - d. Living Building Challenge Red List Compliant.
 - e. Registered as an approved NSF International/Nonfood Compound Registration.
 - f. Abrasion Resistance: Greater than 50 percent improvement over untreated samples when tested in accordance with ASTM C 1353.
 - g. Achieve "High Traction Range" readings when tested in accordance with ANSI B101.1.

- h. Coefficient of Friction: Greater than 0.60 dry, Greater than 0.60 wet when tested in accordance with ASTM C 1028.
- i. Adhesion: Greater than 10 percent increase in pull-off strength when compared to an untreated sample when tested in accordance with ASTM D 4541.
- j. Water Vapor Transmission: 100 percent retained when compared to untreated samples when tested in accordance with ASTM E 96/96M Method B (Water Method).
- k. UV Stability: No degradation or yellowing of material when tested in accordance with ASTM G 154.

2.4 PROTECTIVE TREATMENTS

- A. Penetrating Protective Treatments: Water-based, penetrating clear sealer with a VOC content of 100 g/L or less shall repel and prevent stains from water and oil substances for natural polished concrete surfaces.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide PROSOCO, Inc.; Consolideck Concrete Protector or comparable product by one of the following:
 - a. Americrete, Inc.
 - b. Bomanite Co.
 - c. Scofield, a Business Unit of Sika Corporation.
 - 2. Performance Requirements:
 - a. Compliance with national, state, and district AIM VOC regulations and be 50 g/l or less.
 - b. Living Building Challenge Red List Compliant.
 - c. Achieve "High Traction Range" readings when testing in accordance with ANSI B101.1.
 - d. Coefficient of Friction: Greater than 60 percent dry, 60 percent wet when tested in accordance with ASTM C 1028.

PART 3 - EXECUTION

3.1 POLISHING

- A. Polish: Level 1: Matte finish, 100 grit, Level 2: Low sheen, 400 grit, Level 3: High sheen, 800 grit, Level 4: Gloss shine, 3000 grit. Refer to Finish Schedule on Drawings for locations of Polish Level.
- B. Apply polished concrete finish system to cured and prepared slabs to match accepted mockup.
 - 1. Machine grind floor surfaces to receive polished finishes level and smooth and to depth required to reveal aggregate to match approved mockup.

2. Apply penetrating liquid floor treatment for polished concrete in polishing sequence and according to manufacturer's written instructions, allowing recommended drying time between successive coats.
3. Apply penetrating stain for polished concrete in polishing sequence and according to manufacturer's written instructions.
4. Continue polishing with progressively finer-grit diamond polishing pads to gloss level, to match approved mockup.
5. Control and dispose of waste products produced by grinding and polishing operations.
6. Neutralize and clean polished floor surfaces.

3.2 STAINING

- A. Newly placed concrete shall be at least 30 (Thirty) days old before staining.
- B. Prepare surfaces according to manufacturer's written instructions and as follows:
 1. Clean concrete thoroughly by scraping, applying solvents or stripping agents, sweeping and pressure washing, or scrubbing with a rotary floor machine and detergents recommended by stain manufacturer. Rinse until water is clear and allow surface to dry.
 - a. Do not use acidic solutions to clean surfaces.
 2. Test surfaces with droplets of water. If water beads and does not penetrate surface, or penetrates only in some areas, profile surfaces by grinding, sanding, or abrasive blasting. Retest and continue profiling surface until water droplets immediately darken and uniformly penetrate concrete surfaces.
 3. Neutralize concrete surfaces and rinse until water is clear. Test surface for residue with clean white cloth. Test surface according to ASTM F710 to ensure pH is between 7 - 8.
- C. Scoring: Score decorative jointing in concrete surfaces 1/16 inch deep with diamond blades to match pattern indicated. Rinse until water is clear. Score before staining. Joint width to be 3/8".
- D. Allow concrete surface to dry before applying stain. Verify readiness of concrete to receive stain according to ASTM D4263 by tightly taping 18-by-18-inch, 4-mil-thick polyethylene sheet to a representative area of concrete surface. Apply stain only if no evidence of moisture has accumulated under sheet after 16 hours.
- E. Penetrating Stain: Apply penetrating stain to concrete surfaces according to manufacturer's written instructions and as follows:
 1. Apply first coat of stain to dry, clean surfaces by airless sprayer or by high-volume, low-pressure sprayer.
 2. Allow to dry four hours and repeat application of stain in sufficient quantity to obtain color consistent with approved mockup.
 3. Rinse until water is clear. Control, collect, and legally dispose of runoff.

END OF SECTION 033543

SECTION 042200 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Concrete masonry units.
2. Decorative concrete masonry units.
3. Mortar and grout.
4. Steel reinforcing bars.
5. Masonry-joint reinforcement.
6. Embedded flashing.
7. Miscellaneous masonry accessories.

- B. Related Requirements:

1. Section 017419 - Construction and Demolition Waste Management and Disposal
2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
 - 2. Laboratory Test Reports: For stains and liquid floor treatments, indicating compliance with requirements for low-emitting materials.
- C. Shop Drawings: For the following:
 - 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
 - 2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.
- D. Samples for Initial Selection:
 - 1. Decorative CMUs, in the form of small-scale units.
 - 2. Colored mortar.
- E. Samples for Verification: For each type and color of the following:
 - 1. Decorative CMUs.
 - 2. Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Material Certificates: For each type and size of the following:
 - 1. Masonry units.

- a. Include data on material properties and material test reports substantiating compliance with requirements.
 - b. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
 2. Cementitious materials. Include name of manufacturer, brand name, and type.
 3. Mortar admixtures.
 4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 5. Grout mixes. Include description of type and proportions of ingredients.
 6. Reinforcing bars.
 7. Joint reinforcement.
 8. Anchors, ties, and metal accessories.
- C. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.
 2. Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.
- D. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.
- E. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.8 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C1093 for testing indicated.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
1. Build mockup of typical wall area as shown on Drawings.
 2. Build mockups for each type of exposed unit masonry construction in sizes approximately 48 inches long by 48 inches high by full thickness, joints, a corner and accessories.
 3. Protect accepted mockups from the damage.
 4. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
 - a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.

- b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.10 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.

4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 MANUFACTURERS

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.3 PERFORMANCE REQUIREMENTS

- A. Provide unit masonry that develops indicated net-area compressive strengths at 28 days.
1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.
 2. Determine net-area compressive strength of masonry by testing masonry prisms according to ASTM C1314.

2.4 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6 except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work and will be within 20 feet vertically and horizontally of a walking surface.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
 - 1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.5 CONCRETE MASONRY UNITS

- A. Regional Materials: Verify CMUs are manufactured within 100 miles of Project site from aggregates that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project site.
- B. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 - 2. Provide square-edged units for outside corners unless otherwise indicated.
- C. CMUs: ASTM C90.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide CMU manufactured by Westbrook Block Co., Inc. 479 Spencer Plains Road, Westbrook, CT 06498, (60 miles from manufacturing plant to site) manufactured with Pozzotive®, high performance Supplementary Cementitious Material, made from 100% recycled post-consumer glass, diverted from multiple post-consumer waste streams. The Pozzotive® shall replace up to 30% of the Portland cement used in the manufacture of concrete block. Provide EPD, HPD or similar disclosure documentation. Provide the Basis of Design Product, or a comparable product by one of the following:
 - a. A. Jandris & Sons, Gardner MA (84 miles from manufacturing plant to site)
 - b. Kingston Block & Masonry, Kingston, NY (73 miles from manufacturing plant to site)
 - 2. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi.
 - 3. Density Classification: Normal weight.
 - 4. Size (Width): Manufactured to dimensions 3/8 inch less-than-nominal dimensions.

5. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.
- D. Insulated CMUs: Where indicated, units shall contain rigid, specially shaped, molded-polystyrene insulation units complying with ASTM C578, Type I, designed for installing in cores of masonry units.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Omni-Block, by Westbrook Block or comparable product by one of the following:
 - a. A. Jandris & Sons, "Spec Thermal"
 - b. Insultech, by Oldcastle
 2. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi
 3. CMU Type and Finish:
 - a. CMU Type 1: 12" Split Face, Color to be selected by Architect from manufacturer's full range of options.

2.6 MASONRY LINTELS

- A. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.7 MORTAR AND GROUT MATERIALS

- A. Regional Materials: Manufacture aggregate for mortar and grout within 100 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project site.
- B. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C114.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- E. Masonry Cement: ASTM C91/C91M.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Lehigh Hanson; HeidelbergCement Group; Lehigh Masonry Cement or a comparable product by one of the following:

- a. Cemex S.A.B. de C.V.
- b. Essroc.
- c. Lafarge North America Inc.

F. Aggregate for Mortar: ASTM C144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

G. Aggregate for Grout: ASTM C404.

H. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. BASF Corporation.
- b. Euclid Chemical Company (The); an RPM company.
- c. GCP Applied Technologies Inc.

I. Water: Potable.

2.8 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60.

B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Dur-O-Wal; a Hohmann & Barnard company.
- b. Hohmann & Barnard, Inc.
- c. Wire-Bond.

C. Masonry-Joint Reinforcement, General: Ladder type complying with ASTM A951/A951M.

1. Interior Walls: Mill galvanized carbon steel.
2. Exterior Walls: Hot-dip galvanized carbon steel.
3. Wire Size for Side Rods: 0.148-inch diameter.
4. Wire Size for Cross Rods: 0.148-inch diameter.
5. Spacing of Cross Rods: Not more than 16 inches o.c.
6. Provide in lengths of not less than 10 feet , with prefabricated corner and tee units.

2.9 TIES AND ANCHORS

- A. General: Ties and anchors shall extend at least 1-1/2 inches into masonry but with at least a 5/8-inch cover on outside face.
- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
 1. Mill-Galvanized, Carbon-Steel Wire: ASTM A82/A82M, with ASTM A641/A641M, Class 1 coating.
 2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A82/A82M, with ASTM A153/A153M, Class B-2 coating.
 3. Galvanized-Steel Sheet: ASTM A653/A653M, Commercial Steel, G60 zinc coating.
 4. Steel Sheet, Galvanized after Fabrication: ASTM A1008/A1008M, Commercial Steel, with ASTM A153/A153M, Class B coating.
 5. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

2.10 EMBEDDED FLASHING MATERIALS

- A. Flexible Flashing:
 1. Copper-Laminated Flashing: 5-oz./sq. ft. copper sheet bonded between two layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Advanced Building Products Inc.
 - 2) Hohmann & Barnard, Inc.
 - 3) Wire-Bond.
 - 4) York Manufacturing, Inc.
- B. Application: Unless otherwise indicated, use the following:
 1. Where flashing is partly exposed and is indicated to terminate at the wall face, use flexible flashing with a stainless-steel drip edge.
 2. Where flashing is fully concealed, use flexible flashing.

- C. Single-Wythe CMU Flashing System: System of CMU cell flashing pans and interlocking CMU web covers made from UV-resistant, high-density polyethylene. Cell flashing pans have integral weep spouts designed to be built into mortar bed joints and that extend into the cell to prevent clogging with mortar.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Mortar Net Solutions, "BlockFlash".
 - b. MTI Dry, "Cavity Weep"
 - c. Illinois Products Corporation, IPCO Flashing System
- D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.11 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).

2.12 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
 - 2. Use portland cement-lime or masonry cement mortar unless otherwise indicated.
 - 3. For exterior masonry, use portland cement-lime or masonry cement mortar.
 - 4. For reinforced masonry, use portland cement-lime or masonry cement mortar.
 - 5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

- C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
1. For masonry below grade or in contact with earth, use Type S.
 2. For reinforced masonry, use Type N.
 3. For exterior, above-grade, load-bearing and nonload-bearing walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.
- D. Grout for Unit Masonry: Comply with ASTM C476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
 2. Proportion grout in accordance with ASTM C476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
 3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C143/C143M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
 2. Verify that foundations are within tolerances specified.
 3. Verify that reinforcing dowels are properly placed.
 4. Verify that substrates are free of substances that would impair mortar bond.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Build chases and recesses to accommodate items specified in this and other Sections.
- B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.

- C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- I. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
 - 1. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 078443 "Joint Firestopping."

3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
 - 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
 - 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
 - 3. Bed webs in mortar in grouted masonry, including starting course on footings.
 - 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.

- B. Lay solid CMUs with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.
 - 1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
 - 2. Wet joint surfaces thoroughly before applying mortar.
 - 3. Rake out mortar joints for pointing with sealant.
- D. Rake out mortar joints at pre-faced CMUs to a uniform depth of 1/4 inch and point with epoxy mortar to comply with epoxy-mortar manufacturer's written instructions.
- E. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- F. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.
- G. Cut joints flush where indicated to receive waterproofing unless otherwise indicated.

3.6 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
 - 1. Space reinforcement not more than 16 inches o.c.
 - 2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
 - 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by manufacturer for continuity at [corners,] returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.7 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:

1. Provide an open space not less than 1/2 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.8 CONTROL AND EXPANSION JOINTS

- A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry as follows:
 1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout, and rake out joints in exposed faces for application of sealant.

3.9 LINTELS

- A. Provide masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.
- B. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.10 FLASHING

- A. General: Install embedded flashing at ledges and other obstructions to downward flow of water in wall where indicated.
- B. Install flashing as follows unless otherwise indicated:
 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 2. At lintels, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
 3. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.

4. Install metal drip edges with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
 5. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal drip edge.
 6. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal flashing termination.
 7. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
- C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.
- D. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

3.11 REINFORCED UNIT MASONRY

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 2. Limit height of vertical grout pours to not more than 60 inches.

3.12 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform

tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
3. Place grout only after inspectors have verified proportions of site-prepared grout.

B. Testing Prior to Construction: One set of tests.

C. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.

D. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C140 for compressive strength.

E. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C780.

F. Mortar Test (Property Specification): For each mix provided, according to ASTM C780. Test mortar for mortar air content and compressive strength.

G. Grout Test (Compressive Strength): For each mix provided, according to ASTM C1019.

H. Prism Test: For each type of construction provided, according to ASTM C1314 at 7 days and at 28 days.

3.13 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.

3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

3.14 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Masonry Waste Recycling: Return broken CMUs to manufacturer for recycling.
- C. Excess Masonry Waste: Remove excess clean masonry waste, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042200

SECTION 044313 - ANCHORED STONE MASONRY VENEER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
- B. Products Installed but Not Furnished under This Section Include:
 - 1. Cast stone masonry.
- C. Related Requirements:
 - 1. Section 017419 - Construction and Demolition Waste Management and Disposal
 - 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
 - 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
 - 4. Section 047200 "Cast Stone Masonry" for precast trim units.
 - 5. Section 071416 "Cold Fluid-Applied Waterproofing" for waterproofing membrane on concrete and for molded sheet drainage panels.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. Product Data: For each variety of stone, stone accessory, and manufactured product.
- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Samples for Initial Selection: For colored mortar and other items involving color selection.
- D. Samples for Verification:
 - 1. For each stone type indicated. Include at least four Samples in each set and show the full range of color and other visual characteristics in completed Work.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, supply sources, and other information as required to identify materials used. Include mix proportions for mortar and source of aggregates.
 - 1. Neither receipt of list nor approval of mockups constitutes approval of deviations from the Contract Documents contained in mockups unless Architect approves such deviations in writing.
- C. Material Test Reports:
 - 1. Stone Test Reports: For stone variety proposed for use on Project, by a qualified testing agency, indicating compliance with required physical properties, other than abrasion resistance, according to referenced ASTM standards. Base reports on testing done within previous three years.
 - 2. Sealant Compatibility and Adhesion Test Report: From sealant manufacturer indicating that sealants will not stain or damage stone. Include interpretation of test results and recommendations for primers and substrate preparation needed for adhesion.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs experienced stonemasons and stone fitters.
- B. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Build mockup for each type of stone masonry assembly in sizes approximately 48 inches long by 48 inches high by full thickness, including face and backup wythes and accessories.
 - a. Include stone coping at top of mockup for site walls.
 - b. Include precast stone corner trim at end of mockup for building wall.
 - c. Include precast stone windowsill at top of wall for mockup of south wall at windows.
 - d. Include a sealant-filled joint at least 16 inches long in mockup.
 - e. Include insulation, flashing , masonry veneer anchors, ties and drainage layers, as detailed.
2. Protect accepted mockups from the elements with weather-resistant membrane.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 PRECONSTRUCTION TESTING

- A. Preconstruction Sealant Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for compatibility and adhesion testing according to sealant manufacturer's standard testing methods and Section 079200 "Joint Sealants," Samples of materials that will contact or affect joint sealants.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- B. Store aggregates where grading and other required characteristics can be maintained, and contamination avoided.
- C. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, in a dry location, or in covered weatherproof dispensing silos.
- D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.10 FIELD CONDITIONS

- A. Protection of Stone Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed stone masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
- B. Stain Prevention: Immediately remove mortar and soil to prevent them from staining stone masonry face.
 1. Protect base of walls from rain-splashed mud and mortar splatter using coverings spread on the ground and over the wall surface.
 2. Protect sills, ledges, and projections from mortar droppings.
 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 4. Turn scaffold boards near the wall on edge at end of each day to prevent rain from splashing mortar and dirt on completed stone masonry.
- C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace stone masonry damaged by frost or freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

1.11 COORDINATION

- A. Advise installers of adjacent Work about specific requirements for placement of reinforcement, veneer anchors, flashing, and similar items to be built into stone masonry.
- B. Coordinate locations of dovetail slots installed in concrete that are to receive stone anchors.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 MANUFACTURERS

- A. Source Limitations for Stone: Obtain stone, from single quarry, with resources to provide materials of consistent quality in appearance and physical properties.

- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of uniform quality for each cementitious component from single manufacturer and each aggregate from single source or producer.
- C. Varieties and Sources: Subject to compliance with requirements, provide stone of varieties and from sources complying with Section 044200 "Exterior Stone Cladding."

2.3 RUBBLE STONE

- A. Material Standards:
 - 1. Maximum Absorption per ASTM C97/C97M: 7.5 percent.
 - 2. Minimum Compressive Strength per ASTM C170/C170M: 4000 psi.
- B. Regional Materials: Fabricate stone within 100 miles of Project site from materials that have been extracted, harvested, or recovered within 100 miles of Project site.
- C. Varieties and Sources: Subject to compliance with requirements, available stone varieties that may be incorporated into the Work include, but are not limited to, the following:
 - 1. New England Small and Medium Round Cobble (4 inches nominal), as supplied by O&G Industries; 260 Murphy Road, Hartford, CT 06114.
 - 2. Echo Valley Rounds (4 inches nominal), as supplied by Haynes Materials, 24 Woodbury road, Deep River, CT 06417.
 - 3. Old Redding Rounds (4 inches nominal), as supplied by Connecticut Stone, 138 Woodmont Road, Milford, CT 06460.
- D. Match Architect's samples for color, finish, and other stone characteristics relating to aesthetic effects.

2.4 MORTAR MATERIALS

- A. Regional Materials: Manufacture aggregate for mortar and grout within 100 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project site.
- B. Portland Cement: ASTM C150/C150M, Type I or Type II, except Type III may be used for cold-weather construction; natural color or white cement may be used as required to produce mortar color indicated.
 - 1. Low-Alkali Cement: Not more than 0.60 percent total alkali when tested according to ASTM C114.
 - 2. Control mixes to limit use of cement. Provide not less than the specified strength +10%, - 0%.
- C. Hydrated Lime: ASTM C207, Type S.

- D. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Holcim (US) Inc.
 - b. Lafarge North America Inc.
 - c. Lehigh Hanson; HeidelbergCement Group.
- E. Masonry Cement: ASTM C91/C91M.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Holcim (US) Inc.
 - b. Lafarge North America Inc.
 - c. Lehigh Hanson; HeidelbergCement Group.
- F. Aggregate: ASTM C144 and as follows:
1. For pointing mortar, use aggregate graded with 100 percent passing No. 16 sieve.
 2. Colored Aggregates: Natural-colored sand or ground marble, granite, or other sound stone; of color necessary to produce required mortar color.
- G. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Euclid Chemical Company (The); an RPM company.
 - b. GCP Applied Technologies Inc.
 - c. Sonneborn.
- H. Water: Potable.

2.5 VENEER ANCHORS

- A. Materials:
1. Stainless Steel Wire: ASTM A580/A580M, Type 304.
 2. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304.

- B. Size: Sufficient to extend at least halfway, but not less than 1-1/2 inches, through stone masonry and with at least a 5/8-inch cover on exterior face. Back plate to be extended as required for detailed insulation depth at building walls and 0-inches of insulation at site walls.
- C. Adjustable Anchor System for Rubble Stone: Clip style for insulated wall with concrete backup.
- D. Components to be as follows:
 - 1. 12 Gauge x 2-5/8" wide backplate, with extended horizontal leg to accommodate detailed insulation depth. Provide hole in backplate sized to accommodate chemical anchor to concrete.
 - 2. Ties are bent in the form of triangular loops designed to be attached to masonry joint reinforcement with vertical wires passing through ties and through eyes projecting from masonry joint reinforcement.
- E. Adjustable Masonry-Veneer Anchors:
 - 1. General: Provide anchors that allow vertical adjustment but resist a 100-lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.
 - 2. Fabricate sheet metal anchor sections and other sheet metal parts from 12-gauge, Type 304 stainless steel sheet.
 - 3. Fabricate wire ties from 3/16-inch diameter Type 304 stainless steel wire unless otherwise indicated.
 - 4. Fabricate vertical J-hook wire connector sections from 3/16-inch diameter, Type 304 stainless steel wire with machine fabricated hooks to fit backplate openings.
- F. Adjustable, Clip-style Anchor System for Rubble Stone: Units consisting of a wire tie section, extended backplate and vertical J-hook for attachment through insulation and anchored to concrete, and as follows:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Hohmann & Barnard, Inc; Tie-HVR-195VB Anchor System or a comparable product by one of the following:
 - a. Heckmann Building Products, Inc.
 - b. Wire-Bond.

2.6 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing, where flashing is exposed or partly exposed and where indicated, complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
 - 1. Stainless Steel: ASTM A240/A240M, Type 304, 0.016 inch thick.
 - 2. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
 - 3. Fabricate through-wall metal flashing embedded in masonry from stainless steel, with ribs at 3-inch intervals along length of flashing to provide an integral mortar bond.

- a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1) Cheney Flashing Company.
 - 2) Hohmann & Barnard, Inc.
 - 3) Keystone Flashing Company, Inc.
- 4. Fabricate through-wall flashing with drip edge where indicated. Fabricate by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees.

2.7 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.
- B. Weep/Vent Products: Use one of the following unless otherwise indicated:
 - 1. Rectangular Plastic Tubing: Clear butyrate, 3/8 by 1-1/2 inches by thickness of stone masonry.
 - 2. Mesh Weep Holes/Vents: Free-draining mesh; made from polyethylene strands, full width of head joint and 2 inches high by thickness of stone masonry; in color selected from manufacturer's standard.
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1) CavClear/Archovations, Inc.
 - 2) Mortar Net Solutions.

2.8 MASONRY CLEANERS

- A. Masonry Cleaner: Provide non-toxic, low VOC masonry cleaner.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide PROSOCO, Inc; Enviro Klean, Klean and Release Cleaner or a comparable product by one of the following:
 - a. Diedrich Technologies, Inc.; a Hohmann & Barnard company, Eco-Scrub Cleaner
 - b. Keim Mineral Coatings of America, Inc.; KEIM Bio-Cleaner

2.9 FABRICATION

- A. General: Fabricate stone units in sizes and shapes required to comply with requirements indicated.

- B. Select stone to produce pieces of thickness, size, and shape indicated, including details on Drawings and pattern specified in "Setting Stone Masonry" Article.
- C. Cut and drill sinkages and holes in stone for anchors and supports.
- D. Carefully inspect stone at quarry or fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units before shipment.
- E. Thickness of Stone: Provide thickness indicated, but not less than the following:
 - 1. Thickness: 4 inches plus or minus ½". Thickness does not include projection of pitched faces.
- F. Finish exposed stone faces and edges to comply with requirements indicated for finish and to match approved samples and mockups.
 - 1. Finish: As indicated.

2.10 MORTAR MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
 - 1. Do not use calcium chloride.
 - 2. Use Portland cement-lime, masonry cement or mortar cement mortar unless otherwise indicated.
 - 3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
 - 4. Mixing Pointing Mortar: Thoroughly mix cementitious and aggregate materials together before adding water. Then mix again, adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for one to two hours. Add remaining water in small portions until mortar reaches required consistency. Use mortar within 30 minutes of final mixing; do not retemper or use partially hardened material.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in the form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Stone Masonry: Comply with ASTM C270, Property Specification.
 - 1. Mortar for Setting Stone: Type S or Type N.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces indicated to receive stone masonry, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of stone masonry.
- B. Examine substrate to verify that dovetail slots, inserts, reinforcement, veneer anchors, flashing, and other items installed in substrates and required for or extending into stone masonry are correctly installed.
- C. Examine wall framing, sheathing, and weather-resistant sheathing paper to verify that stud locations are suitable for spacing of veneer anchors and that installation will result in a weatherproof covering.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Accurately mark stud centerlines on face of weather-resistant sheathing paper before beginning stone installation.
- B. Coat concrete backup with specified waterproofing.
- C. Clean dirty or stained stone surfaces by removing soil, stains, and foreign materials before setting. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.

3.3 INSTALLATION OF STONE MASONRY

- A. Perform necessary field cutting and trimming as stone is set.
 - 1. Use power saws to cut stone that is fabricated with saw-cut surfaces. Cut lines straight and true, with edges eased slightly to prevent snipping.
 - 2. Use hammer and chisel to split stone that is fabricated with split surfaces. Make edges straight and true, matching similar surfaces that were shop or quarry fabricated.
 - 3. Pitch face at field-split edges as needed to match stones that are not field split.
- B. Sort stone before it is placed in wall to remove stone that does not comply with requirements relating to aesthetic effects, physical properties, or fabrication, or that is otherwise unsuitable for intended use.
- C. Arrange stones in uncoursed rubble pattern with joint widths within tolerances indicated. Insert small stones into spaces between larger stones as needed to produce joints as uniform in width as practical.

- D. Arrange stones with color and size variations uniformly dispersed for an evenly blended appearance.
- E. Install supports, fasteners, and other attachments indicated or necessary to secure stone masonry in place.
- F. Set stone accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.
- G. Maintain uniform joint widths except for variations due to different stone sizes and where minor variations are required to maintain bond alignment if any. Lay walls with joints not less than 3/8 inch at narrowest points or more than 1 1/4 inch at widest points.
- H. Provide sealant joints of widths and at locations indicated.
 - 1. Keep sealant joints free of mortar and other rigid materials.
 - 2. Sealant joints are specified in Section 079200 "Joint Sealants."
- I. Install embedded flashing and weep holes at ledges and other obstructions to downward flow of water in wall, and where indicated.
 - 1. At tops of site walls, below pre-cast stone caps, install metal flashing and extend sheet metal flashing 1/2 inch beyond masonry face at exterior, and turn flashing down to form a drip.
- J. Place weep holes and vents in joints where moisture may accumulate, including at base of walls and other obstructions.
 - 1. Use rectangular plastic tubing or mesh weep holes/vents to form weep holes.
 - 2. Space weep holes 16 inches o.c.

3.4 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces, do not exceed 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch in 40 feet or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/4 inch in 20 feet or 1/2 inch in 40 feet or more.
- B. Variation from Level: For lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4 inch in 20 feet or 1/2 inch in 40 feet or more.
- C. Variation of Linear Building Line: For position shown in plan, do not exceed 1/2 inch in 20 feet or 3/4 inch in 40 feet or more.
- D. Measure variation from level, plumb, and position shown in plan as a variation of the average plane of each stone face from level, plumb, or dimensioned plane.
- E. Variation in Mortar-Joint Thickness: Do not vary from joint size range indicated.

- F. Variation in Plane between Adjacent Stones: Do not exceed one-half of tolerance specified for thickness of stone.

3.5 INSTALLATION OF ANCHORED STONE MASONRY

- A. Anchor stone masonry to concrete with veneer anchors indicated. Secure anchors by chemical anchors in concrete.
- B. Space anchors to provide not less than one anchor per 2 sq. ft. of wall area. Install additional anchors within 12 inches of openings, sealant joints, and perimeter at intervals not exceeding 12 inches.
- C. Anchor stone trim with stone trim anchors where indicated. Install anchors by fastening to substrate and inserting tabs and dowels into kerfs and holes in stone units. Provide compressible filler in ends of dowel holes and bottoms of kerfs to prevent end bearing of dowels and anchor tabs on stone. Fill remainder of anchor holes and kerfs with mortar.
- D. Set stone in full bed of mortar with full head joints unless otherwise indicated. Build anchors into mortar joints as stone is set.
- E. Fill collar joint and space between back of stone masonry and drainage board at building walls and waterproofing at site walls with mortar as stone is set.
- F. Rake out joints for pointing with mortar to depth of not less than 1/2 inch before setting mortar has hardened. Rake joints to uniform depths with square bottoms and clean sides.

3.6 ADJUSTING AND CLEANING

- A. Remove and replace stone masonry of the following description:
 - 1. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if methods and results are approved by Architect.
 - 2. Defective joints.
 - 3. Stone masonry not matching approved samples and mockups.
 - 4. Stone masonry not complying with other requirements indicated.
- B. Replace in a manner that results in stone masonry matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean stone masonry as work progresses. Remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean stone masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

2. Test cleaning methods on mockup; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before cleaning stone masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
4. Wet wall surfaces with water before applying cleaner; remove cleaner promptly by rinsing thoroughly with clear water.
5. Clean stone masonry by bucket and brush hand-cleaning method described in BIA Technical Note No. 20, Revised II, using job-mixed detergent solution.
6. Clean stone masonry with cleaner applied according to manufacturer's written instructions.

3.7 EXCESS MATERIALS AND WASTE

- A. Excess Stone: Stack excess stone where directed by Owner for Owner's use.
- B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, and legally dispose of off Owner's property.

END OF SECTION 044313

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SECTION 047200 - CAST STONE MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- A. Cast-stone trim, including the following:

- a. Window sills.
 - b. Site wall caps.
 - c. Water tables.
 - d. Corner Trim.

- B. Related Sections:

- A. Section 017419 - Construction and Demolition Waste Management and Disposal
 - B. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
 - C. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
 - D. Section 042000 "Unit Masonry" for installing cast-stone units in unit masonry.
 - E. Section 044313 "Anchored Stone Masonry Veneer" for installing cast stone units in rubble stone masonry.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - A. For cast-stone units, include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details for cast-stone units. Include dimensions, details of reinforcement and anchorages if any, and indication of finished faces.
 - A. Include building and wall elevations showing layout of units and locations of joints and anchors.
- C. Samples for Initial Selection: For colored mortar.
- D. Samples for Verification:
 - A. For each color and texture of cast stone required, 10 inches square in size.
 - B. For each trim shape required, 10 inches in length.
 - C. For colored mortar, make Samples using same sand and mortar ingredients to be used on Project. Label Samples to indicate types and amounts of pigments used.
- E. Full-Size Samples: For each color, texture and shape of cast-stone unit required.
 - A. Make available for Architect's review at Project site.
 - B. Make Samples from materials to be used for units used on Project immediately before beginning production of units for Project.
 - C. Approved Samples may be installed in the Work.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and testing agency.
 - A. Include copies of material test reports for completed projects, indicating compliance of cast stone with ASTM C1364.
- B. Material Test Reports: For each mix required to produce cast stone, based on testing according to ASTM C1364[, including test for resistance to freezing and thawing].
 - A. Provide test reports based on testing within previous two years.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer of cast-stone units similar to those indicated for this Project, that has sufficient production capacity to manufacture required units, and is a plant certified by the Cast Stone Institute, the Architectural Precast Association or the Precast/Prestressed Concrete Institute for Group A, Category AT.

- B. Testing Agency Qualifications: Qualified according to ASTM E329 for testing indicated.
- C. Mockups: Furnish cast stone for installation in mockups specified in Section 042000 "Unit Masonry."
- D. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Coordinate delivery of cast stone with unit masonry work to avoid delaying the Work.
- B. Pack, handle, and ship cast-stone units in suitable packs or pallets.
 - A. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast-stone units if required, using dollies with wood supports.
 - B. Store cast-stone units on wood skids or pallets with nonstaining, waterproof covers, securely tied. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.
- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- D. Store mortar aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

1.8 PROJECT CONDITIONS

- A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements in TMS 602/ACI 530.1/ASCE 6.
 - A. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until cast stone has dried, but no fewer than seven days after completing cleaning.
- B. Hot-Weather Requirements: Comply with hot-weather construction requirements in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 MANUFACTURERS

- A. Source Limitations for Cast Stone: Obtain cast-stone units from single source from single manufacturer.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

2.3 CAST-STONE MATERIALS

- A. General: Comply with ASTM C1364.
- B. Portland Cement: ASTM C150/C150M, Type I or Type III, containing not more than 0.60 percent total alkali when tested according to ASTM C114. Provide natural color or white cement as required to produce cast-stone color indicated.
- C. Coarse Aggregates: Granite, quartz, or limestone complying with ASTM C33/C33M; gradation and colors as needed to produce required cast-stone textures and colors.
- D. Fine Aggregates: Natural sand or crushed stone complying with ASTM C33/C33M, gradation and colors as needed to produce required cast-stone textures and colors.
- E. Color Pigment: ASTM C979/C979M, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.
- F. Admixtures: Use only admixtures specified or approved in writing by Architect.
 - A. Do not use admixtures that contain more than 0.1 percent water-soluble chloride ions by mass of cementitious materials. Do not use admixtures containing calcium chloride.
 - B. Use only admixtures that are certified by manufacturer to be compatible with cement and other admixtures used.
 - C. Air-Entraining Admixture: ASTM C260/C260M. Add to mixes for units exposed to the exterior at manufacturer's prescribed rate to result in an air content of 4 to 6 percent, except do not add to zero-slump concrete mixes.
 - D. Water-Reducing Admixture: ASTM C494/C494M, Type A.
 - E. Water-Reducing, Retarding Admixture: ASTM C494/C494M, Type D.
 - F. Water-Reducing, Accelerating Admixture: ASTM C494/C494M, Type E.
- G. Reinforcement: Deformed steel bars complying with ASTM A615/A615M, Grade 60. Use galvanized or epoxy-coated reinforcement when covered with less than 1-1/2 inches of cast-stone material.
 - A. Epoxy Coating: ASTM A775/A775M.
 - B. Galvanized Coating: ASTM A767/A767M.

- H. Embedded Anchors and Other Inserts: Fabricated from stainless steel complying with ASTM A240/A240M, ASTM A276, or ASTM A666, Type 304.

2.4 CAST-STONE UNITS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Cast-stone manufactured by Westbrook Block Co., Inc. 479 Spencer Plains Road, Westbrook, CT 06498, (60 miles from manufacturing plant to site) or a comparable product by one of the following:
 - a. A. Jandris & Sons, Gardner MA (84 miles from manufacturing plant to site)
 - b. Kingston Block & Masonry, Kingston, NY (73 miles from manufacturing plant to site)
- B. Regional Materials: Manufacture cast stone units within 100 miles of Project site from aggregates that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project site.
- C. Cast-Stone Units: Comply with ASTM C1364.
 - A. Units shall be manufactured using the vibrant dry tamp or wet-cast method.
 - B. Units shall be resistant to freezing and thawing as determined by laboratory testing according to ASTM C666/C666M, Procedure A, as modified by ASTM C1364.
- D. Fabricate units with sharp arris and accurately reproduced details, with indicated texture on all exposed surfaces unless otherwise indicated.
 - A. Slope exposed horizontal surfaces 1:12 to drain unless otherwise indicated.
 - B. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.
 - C. Provide drips on projecting elements unless otherwise indicated.
- E. Fabrication Tolerances:
 - A. Variation in Cross Section: Do not vary from indicated dimensions by more than 1/8 inch.
 - B. Variation in Length: Do not vary from indicated dimensions by more than 1/360 of the length of unit or 1/8 inch, whichever is greater, but in no case by more than 1/4 inch.
 - C. Warp, Bow, and Twist: Not to exceed 1/360 of the length of unit or 1/8 inch, whichever is greater.
 - D. Location of Grooves, False Joints, Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8 inch on formed surfaces of units and 3/8 inch on unformed surfaces.
- F. Cure Units as Follows:
 - A. Cure units in enclosed, moist curing room at 95 to 100 percent relative humidity and temperature of 100 deg F for 12 hours or 70 deg F for 16 hours.
 - B. Keep units damp and continue curing to comply with one of the following:

- a. No fewer than five days at mean daily temperature of 70 deg F or above.
- b. No fewer than six days at mean daily temperature of 60 deg F or above.
- c. No fewer than seven days at mean daily temperature of 50 deg F or above.
- d. No fewer than eight days at mean daily temperature of 45 deg F or above.

- G. Etch units after curing to remove cement film from surfaces to be exposed to view.
- H. Colors and Textures: As selected by Architect from manufacturer's full range.

2.5 MORTAR MATERIALS

- A. Provide mortar materials that comply with Section 042000 "Unit Masonry."
- B. Aggregate for Mortar: ASTM C144.
 - A. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 - B. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
 - C. Colored Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- C. Water: Potable.

2.6 ACCESSORIES

- A. Anchors: Type and size indicated, fabricated from Type 304 stainless steel complying with ASTM A240/A240M, ASTM A276, or ASTM A666.
- B. Dowels: 1/2-inch-diameter round bars, fabricated from Type 304 stainless steel complying with ASTM A240/A240M, ASTM A276, or ASTM A666.
- C. Masonry Cleaner: Provide non-toxic, low VOC masonry cleaner.
 - A. Basis-of-Design Product: Subject to compliance with requirements, provide PROSOCO, Inc; Enviro Klean, Klean and Release Cleaner or a comparable product by one of the following:
 - a. Diedrich Technologies, Inc.; a Hohmann & Barnard company, Eco-Scrub Cleaner
 - b. Keim Mineral Coatings of America, Inc.; KEIM Bio-Cleaner

2.7 MORTAR MIXES

- A. Comply with requirements in Section 042000 "Unit Masonry" for mortar mixes.

2.8 SOURCE QUALITY CONTROL

- A. Engage a qualified independent testing agency to sample and test cast-stone units according to ASTM C1364.
 - A. Include one test for resistance to freezing and thawing.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SETTING CAST STONE IN MORTAR

- A. Install cast-stone units to comply with requirements in Section 042000 "Unit Masonry."
- B. Set cast stone as indicated on Drawings. Set units accurately in locations indicated, with edges and faces aligned according to established relationships and indicated tolerances.
 - A. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
 - B. Coordinate installation of cast stone with installation of flashing specified in other Sections.
- C. Wet joint surfaces thoroughly before applying mortar or setting in mortar.
- D. Set units in full bed of mortar with full head joints unless otherwise indicated.
 - A. Set units with joints 1/4 to 3/8 inch wide unless otherwise indicated.
 - B. Build anchors and ties into mortar joints as units are set.
 - C. Fill dowel holes and anchor slots with mortar.
 - D. Fill collar joints solid as units are set.
 - E. Build concealed flashing into mortar joints as units are set.
 - F. Keep head joints in copings and between other units with exposed horizontal surfaces open to receive sealant.
 - G. Keep joints at shelf angles open to receive sealant.
- E. Rake out joints for pointing with mortar to depths of not less than 3/4 inch. Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.

- F. Point mortar joints by placing and compacting mortar in layers not greater than 3/8 inch. Compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
- G. Tool exposed joints slightly concave when thumbprint hard. Use a smooth plastic jointer larger than joint thickness.
- H. Rake out joints for pointing with sealant to depths of not less than 3/4 inch. Scrub faces of units to remove excess mortar as joints are raked.
- I. Provide sealant joints at head joints of copings and other horizontal surfaces; at expansion, control, and pressure-relieving joints; and at locations indicated.
 - A. Keep joints free of mortar and other rigid materials.
 - B. Build in compressible foam-plastic joint fillers where indicated.
 - C. Form joint of width indicated, but not less than 3/8 inch.
 - D. Prime cast-stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant unless otherwise indicated.
 - E. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in Section 079200 "Joint Sealants."

3.3 INSTALLATION TOLERANCES

- A. Variation from Plumb: Do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
- B. Variation from Level: Do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
- C. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches or one-fourth of nominal joint width, whichever is less.
- D. Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16 inch, except where variation is due to warpage of units within tolerances specified.

3.4 ADJUSTING AND CLEANING

- A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.
- B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean cast stone as work progresses.
 - A. Remove mortar fins and smears before tooling joints.

- B. Remove excess sealant immediately, including spills, smears, and spatter.

- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:
 - A. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - B. Test cleaning methods on sample; leave one sample uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of cast stone.
 - C. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 - D. Wet surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
 - E. Clean cast stone by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
 - F. Clean cast stone with proprietary acidic cleaner applied according to manufacturer's written instructions.

END OF SECTION 047200

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SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work specified in this section.

1.2 SUMMARY

- A. Extent of structural steel work is shown on Drawings, including schedules, notes, details and type of steel required.
- B. Structural steel is that work defined in American Institute of Steel Construction, AISC 303, "Code of Standard Practice for Steel Buildings and Bridges" and as otherwise shown on Drawings.
- C. The following related work is specified elsewhere in Division 5.
 - 1. Steel Joist Framing (052100)
 - 2. Steel Decking (053100)
 - 3. Cold-Formed Metal Framing (054000)
 - 4. Cold-Formed Metal Trusses (054400)
 - 5. Metal Fabrications (055000)

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with Provisions of following except as otherwise indicated:
 - 1. AISC 303 "Code of Standard Practice for Steel Buildings and Bridges" – Edition adopted by current code.
 - 2. AISC 360 "Specifications for Structural Steel Buildings – Edition adopted by current code.
 - 3. RCSC's "Specifications for Structural Joints using High-Strength Bolts" – Edition adopted by current code.
 - 4. AISC 341 "Seismic Provisions for Structural Steel Buildings" – Edition adopted by current code.
 - 5. American Welding Society, AWS, D1.1 "Structural Welding Code".

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6. ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use".
 7. ASTM A 123 "Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products."
 8. American Hot Dip Galvanizers Association, "Inspection Manual for Hot Dip Galvanized Steel Products".
- B. Fabricator Qualifications: Fabricator must have a minimum of 5 years successful experience in the fabrication of structural steel framing components similar, in nature, to those required for this project. In addition, the fabricator shall have a quality control program acceptable to the Engineer.
- C. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector.
- D. Qualifications for Welding Work: Qualify procedures and personnel according to AWS D.1/D1.1M "Structural Welding Code-Steel."
- Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests within previous 12 months.
1. If recertification of welders is required, retesting will be Contractor's responsibility.
- E. Special Inspection: The Owner will engage the services of a qualified "Special Inspector" for this project. The Special Inspector, as a representative of the Owner, will confirm that the provisions of Chapter 17 of the International Building Code are complied with and will provide and/or supervise inspection and testing requirements, as necessary.
- F. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- G. Steel fabricator shall be subject to Special Inspection requirements of the Building Code for fabrication plants and as defined in Part A and Part B below.

Part A Inspection – Verification of Capability and Quality Control: The Special Inspector will confirm that the structural steel fabricating plant has the personnel, organization, knowledge, experience, procedures, equipment, capability, and commitment to produce fabricated structural steel of the required quality of the category of structural steel work involved in the project. The basis of inspection will be the AISC manual "Quality Criteria and Inspection Standards".

A structural steel fabricator that is Certified in Category II under the AISC Quality Certification Program may be exempted from Part A.

Part B Inspection – Verification of Implementation: The Special Inspector will confirm the implementation of the design by inspecting the fabrication of structural steel load bearing connections, members or assemblies in the shop to ensure conformance with the design plans, approved shop drawings and project specifications. Inspection shall consist

of one or more of the following: Observation, interviews, testing, and/or examination of records.

- H. The Special Inspector will inspect high-strength bolted connections and welded connections, perform tests, examine steel for straightness and alignment, fissures, mill scale, and other defects and deformities as described in ASTM A6, examine fabricated pieces for conformity with approved shop drawings including member sizes and prepare test reports as required.

Testing agency shall conduct and interpret tests and state in each report whether test specimens comply with requirements, and specifically state any deviations therefrom.

- I. The Contractor shall furnish such facilities and provide such assistance as may be required for carrying out the inspection prescribed herein. He shall notify the inspection agency at least two weeks in advance of the start of any qualification testing or welding.

- J. The Special Inspector will perform his duties, insofar as possible, in such a way that neither fabrication nor erection is unnecessarily delayed or impeded.

Field inspection will include examination of erected steel for welding, proper fitting, tensioning of bolts, alignment, trueness and plumbness.

- K. Contractor shall correct deficiencies in structural steel work which inspections and laboratory test reports have indicated to be not in compliance with requirements. Additional tests will be performed at contractor's expense, as may be necessary to reconfirm any non-compliance of original work, and as may be necessary to show compliance of corrected work.

- L. Shop bolted connections will be inspected in accordance with AISC specifications and "Specification for Structural Joints using High Strength Bolts", Latest Edition.

- M. Shop Welding will be inspected and tested during fabrication of structural steel assemblies, as follows:

1. Verify welder certification and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
2. The inspection agency will test shop welds as follows:

All welds: 100% visual according to AWS D1.1/D1.M and the following inspection procedures, at testing agency's option:

1. Liquid Penetrant Inspection: ASTM E165.
2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration not accepted.
3. Ultrasonic Inspection: ASTM E 164.
4. Radiographic Inspection: ASTM E 94.

All moment connection full penetration welds: 20% (50% if fabricator is not certified by AISC) ultrasonic conforming to ASTM E164.

- a) Inspection level: If more than 10 percent of the welds are rejected then an additional 20 percent of the welds shall be tested. If 10 percent of these additional welds are found to be rejectable then an additional 20% of all full penetration welds will be tested. If 10 percent of this group is rejected then 100% of the welds will be tested.
- N. In addition to visual inspection, test and inspect shop-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
1. Perform bend tests if visual inspections reveal either a less-than-continuous 360 degree flash or welding repairs to any shear connector.
 2. Conduct tests according to requirement in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors already tested.
- O. Field bolted connections will be inspected to confirm compliance to Sections 2, 3 and 8 of AISC "Specification for Structural Joints Using High-Strength Bolts". Observe calibration procedures for calibration devices used on the project and monitor the installation of bolts to determine that all plies of connected material have been drawn together and that the selected procedure is properly used to tighten all bolts.
1. Visually inspect all bolted connections to verify that connection is fully compacted.
 2. Slip-Critical Connections and Connections Subject to Axial Tension:

The installation and tightening of all slip-critical connections and connections subject to axial tension will be observed to assure that the specified procedure was followed to achieve the pretension specified in Table 8.1 "Minimum Bolt Pretension, Pretensioned and Slip-Critical Joints, AISC "Specification for Structural Joints Using High-Strength Bolts". All other slip-critical connections will be tested in conformance to AISC "Specification for Structural Joints Using High-Strength Bolts".
- P. Field Welding will be inspected and tested during erection of structural steel as follows:
1. Verify welder certification and conduct inspection and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
 2. The inspection agency will test field welds as follows:

All welds: 100% visual.

All moment connection full penetration welds: 100% ultrasonic conforming to ASTM E164.

3. Comply with AWS D1.1/D1.1M for tolerances, appearances, welding, procedure specifications, weld quality, and methods used in correcting welding work.
 4. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections and removal of paint on surfaces adjacent to field welds.
 5. Remove backing bars or runoff tabs where indicated, back gauge and grind steel smooth.
 6. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.
- Q. For weld tests, reports by the Agency inspector will contain, as a minimum, an adequate description of each weld tested, the identifying mark of the welder responsible for the weld, a critique of statement regarding the acceptability of the weld tested, as judged by current A.W.S. Standards.

1.4 SUBMITTALS:

- A. Product Data: Submit producer's or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).
1. High-strength bolts (each type), including nuts and washers.
 2. Shrinkage-resistant grout.
- B. Shop Drawings: Submit shop drawings (in electronic form) including complete details and schedules for fabrication and assembly of structural steel members, procedures and diagrams.
1. Include details of cuts, connections, splices, camber, holes and other pertinent data.
 2. Include embedment drawings.
 3. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed by others.
 4. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
 5. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pre-tensioned and slip-critical, high-strength bolted connections.
- C. Welding Procedure Specifications (WPS's) and Procedure Qualification Records (PQR's): Provide according to AWS D1.1/D1.1M, "Structural Welding Code-Steel," for each welded joint, whether prequalified or qualified by testing, including the following:

1. Power Source (constant current or constant voltage).
 2. Electrode Manufacturer and trade name, for demand critical welds.
- D. Engineered Submittal: For structural steel connections indicated to comply with design loads, include detailed analysis data to verify compliance with requirements. Submit for review a minimum of two weeks prior to erection and piece drawings.
- E. Qualification Data for Installer, Fabricator, Testing Agencies.
- F. Welding Certificates.
- G. Mill test reports for structural steel including chemical and physical properties.
- H. Product Test Reports for the following:
1. Bolts, nuts and washers, including mechanical properties and chemical analysis.
 2. Direct-tension indicators.
 3. Tension-control, high-strength bolt-nut-washer assemblies.
 4. Shear Stud connectors.
 5. Non-shrink grout.
- I. Survey of existing conditions.
- J. Source and Field quality-control reports.
- K. Special Inspection Reports.
- 1.5 DELIVERY, STORAGE AND HANDLING
- A. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not delay that work.
- B. Store materials to permit easy access for inspection and identification. Keep steel members off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.
1. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.
- C. For galvanized materials comply with ASTM A 123.
- D. Store fasteners in a protected place, in sealed containers with manufactures labels intact.
1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seal containers.
 2. Clean and re-lubricate bolts and nuts that become dry and rusty before use.

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3. Comply with manufacturer's written recommendations for cleaning and lubricating ASTM F 1852 Fasteners and for retesting fasteners after re-lubrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Connections: Provide details of connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand loads indicated and comply with other information and restrictions indicated.

1. Use Allowable Stress Design; data are given at service load level.

- B. Moment Connections: Fully restrained.
- C. Construction: Shear walls

2.2 MATERIALS

- A. Metal Surfaces, General: For fabrication of work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating and application of surface finishes.
- B. W-Shapes: ASTM A 992
- C. Channels, Angles: ASTM A36
- D. Structural Steel, Plates and Bars: ASTM A 36 or ASTM A 572 Grade 50 or ASTM A529, as indicated on the Drawings.
- E. Cold Formed Hollow Structural Sections: ASTM A500, Grade B.
- F. Material for galvanizing shall be geometrically suitable for galvanizing as specified in ASTM A 384 and A 385.
- G. Anchor Bolts: ASTM F 1554, unheaded type unless otherwise indicated on the Drawings.
- H. High-Strength Bolts, Nuts and Washers: ASTM A325 or A490, Type 1, heavy-hex steel structural bolts.
- I. Unfinished Threaded Fasteners: ASTM A36, regular low-carbon steel bolts and nuts.
 1. Provide hexagonal heads and nuts for all connections.
- J. High-Strength Threaded Fasteners: Heavy hexagon structural "tension control" bolts, heavy hexagon nuts, hardened washers as follows:

1. Quenched and tempered medium-carbon steel bolts, nuts and washers, complying with ASTM A 325.
- K. Headed Stud-Type Shear Connectors: ASTM A 108, Grade 1015 through 1020 cold finished carbon steel; with dimensions complying with AISC specifications.
- L. Electrodes for Welding: Comply with AWS Code.
- M. Non-Metallic Non-Shrink Grout: Premixed, non-metallic, non-corrosive, non-staining product containing selected silica sands, Portland cement, shrinkage compensating agents, plasticizing and water reducing agents, complying with ASTM C1107 and suitable to be placed for 30-minute working time.
- N. Zinc for Galvanizing: As specified in ASTM A123.
- O. Primer:
1. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services). "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers".
 2. Primer Fabricators standard lead and chromate-free, nonasphaltic, rust-inhabiting primer complying with MPI #79 and compatible with topcoat.
 3. Galvanizing Repair Paint: Comply with ASTM A780.

2.3 FABRICATION

- A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings.
1. Camber Structural Steel members where indicated.
 2. Fabricate beams with rolling camber up.
 3. Identify high-strength structural steel according to ASTM A 6 and maintain markings until structural steel has been erected.
 4. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.
 5. Complete structural steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
1. Plane thermally cut edges to be welded to comply with requirements in AWS

D1.1.

2. Thermal cutting in the field is not permitted without written consent from the engineers.
- C. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- D. Cleaning: Clean and prepare steel surfaces that are to remain unpainted to SSPC-SP2."Hand Tool Cleaning
- E. Connections: Weld or bolt shop connection, as indicated.
- Bolt field connections with "tension control" bolts, except where welded or other connections are indicated.
1. Provide high-strength threaded fasteners for principal bolted connections, except where unfinished bolts are indicated.
- F. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and Manufacturer's written instructions.
- G. Holes for Other Work: Provide holes required for securing other work to structural steel framing, and for passage of other work through steel framing members, as shown on final shop drawings.
1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 2. Baseplate holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.
- H. Web Penetrations: For structural steel beams and girders, web penetrations will be permitted for passage of other work, without prior approval of the Engineer, only if the maximum opening dimension does not exceed the lesser of 6" or .25d (d equals beam depth), if the penetration is located in the middle third of the beam span and if no concentrated load is located nearer than 2'-0" from the edge of the penetration. All other penetrations require prior approval by the Engineer.
1. Penetrations, not circular in nature, shall have a minimum radius of 1" at all corners and all edges of the penetration shall be provided with a reasonably even and smooth surface.

2.3 SHOP PRIMING

- A. Shop prime steel surfaces except the following:

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1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 2. Surfaces to be field welded.
 3. Surfaces of high-strength bolted, slip-critical connections.
 4. Surfaces to receive sprayed fire-resistant materials (applied fireproofing).
 5. Galvanized surfaces.
 6. Surfaces enclosed in interior construction.
- B. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommend by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.
- C. Painting: Prepare steel and apply a one-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Priming Systems", to provide a dry thickness of not less than 1.5 mils.

2.4 GALVANIZING

- A. Apply Zinc coating by hot-dip process to structural steel members, fabrications, and assemblies according to ASTM A 123.
- B. Safeguard against steel embrittlement in conformance with ASTM A 143.
- C. Safeguard against warpage or distortion of steel members to conform with ASTM A 384. Notify Architect/Engineer of potential warpage problems which may require modification in design, before proceeding with steel fabrications.
- D. Bolts, nuts, and washers, and iron and steel hardware components to be galvanized in accordance with ASTM A 153. Nuts to be tapped after galvanizing to minimum diametral amounts specified in ASTM A 563. Coat nuts with waterproof lubricant, clean and dry to touch. High strength bolts for structural steel joints to be galvanized in accordance with ASTM A 325.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Erector must examine areas and conditions under which structural steel work is to be installed, and notify Contractor in writing of conditions detrimental to proper and timely completion of work.

3.2 ERECTION:

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- A. Surveys: Employ a registered land surveyor to establish permanent bench marks as shown and as necessary for accurate erection of structural steel. Check elevations of concrete and masonry bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies to Engineer. Do not proceed with erection until corrections have been made, or until compensating adjustments to structural steel work have been agreed upon with Engineer.
- B. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide guy lines to achieve proper alignment of structures as erection proceeds. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.
- C. Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete work.
- D. Anchor Bolts: Furnish anchor bolts and other connectors required for securing structural steel to foundations and other in-place work.
- Furnish templates and other devices as necessary for presetting bolts and other anchors to accurate locations.
1. Refer to Division 3 of these specifications for anchor bolt installation requirements in concrete, and Division 4 for masonry installation.
- E. Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.
- F. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.
- G. Pack non-shrink grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials and allow to cure.
1. For proprietary grout materials, comply with manufacturer's instructions.
- H. Field Assembly: Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming a part of a complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
1. Level and plumb individual members of structure within specified AISC tolerances. Adjust and weld in final position all structural steel angles which support architectural finish material. Adjustments are to be made to the tolerances of the applied finish materials.

2. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.
 3. Splice members only where indicated and accepted on shop drawings.
- I. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces.
 - J. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

Do not enlarge unfair holes in members by burning or by use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.
 - K. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in structural framing. Cutting will be permitted only on secondary members which are not under stress, as acceptable to Engineer. Finish gas cut sections equal to a sheared appearance when permitted.
 - L. Do not use thermal cutting during erection.
 - M. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas with same material as used for shop painting.
 - N. Touch-Up Galvanized Surfaces: Repair damaged galvanized surfaces in accordance with ASTM A 780. Dry film thickness of applied repair materials to be not less than galvanized coating thickness required by ASTM A 123 or A 153, as applicable. Touch up prime-painted surfaces with same galvanized primer applied in shop. Clean damaged surfaces first to assure proper paint adhesion.

END OF SECTION 051200

SECTION 053100 - STEEL DECKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work specified in this section.

1.2 DESCRIPTION OF WORK

- A. The extent of steel decking is shown on the drawings, including basic layout and type of deck units required.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes and standards, except as otherwise shown or specified:
 - 1. American Iron and Steel Institute, AISI "Specification for the Design of Cold-Formed Steel Structural Members".
 - 2. American Welding Society, AWS D1.3 "Structural Welding Code-Sheet Steel".
 - 3. Steel Deck Institute, SDI "Design Manual for Composite Decks, Form Decks and Roof Decks".
- B. Welding Qualifications: Qualify Procedures and personnel according to AWS D1.3.
- C. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- D. Welded decking in place is subject to inspection and testing. Expense of removing and replacing portions of decking for testing purposes shall be borne by Owner if welds are found to be satisfactory. Work found to be defective will be removed and replaced with new acceptable work, at the expense of the Contractor.
- E. Owner will engage a qualified testing agency to perform tests and inspections.
 - 1. Remove and replace work that does not comply with specified inspections.

2. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

F. Special Inspection: The Owner will engage the services of a qualified "Special Inspector" for this project. The Special Inspector, as a representative of the Owner, will confirm that the provisions of Chapter 17 of the International Building Code are complied with and will provide and/or supervise inspection and testing requirements, as necessary.

1. In-place steel decking will be visually inspected for deck orientation and connector size and spacing to confirm compliance to Contract Documents.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications and installation instructions for each type of decking and accessories. Include manufacturer's certification as may be required to show compliance with these specifications.
- B. Shop Drawings: Submit detailed drawings showing layout and types of deck panels, anchorage details, and conditions requiring closure panels, supplementary framing, sump pans, cant strips, cut openings, special jointing or other accessories.
- C. Field Quality-Control reports.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. COMPOSITE FLOOR DECK: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with "SDI Specifications and Commentary for Composite Steel Floor Deck," in SDI Publication No. 31, with the minimum section properties indicated, and with the following:
 - 1. Prime-Painted Steel Sheet: ASTM A 1008, Structural Steel (SS), Grade 33 minimum, with top surface phosphatized and unpainted and underside surface shop primed with manufacturers' standard baked-on, rust-inhibitive primer.

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2. Galvanized-Steel Sheet: ASTM A 653, Structural Steel (SS), Grade 33, G60 zinc coating.
 3. Span Condition: Triple span or more where possible.

B. ACCESSORIES: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

1. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
2. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
3. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
4. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
5. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), of same material and finish as deck, and of thickness and profile recommended by SDI Publication No. 31 for overhang and slab depth.
6. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck unless otherwise indicated.
7. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.
8. Weld Washers: Uncoated steel sheet, shaped to fit deck rib with factory-punched hole of 3/8-inch minimum diameter.
9. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck. For drains, cut holes in the field.

2.2 FABRICATION

- A. General: Form deck units in lengths to span 3 or more supports, with flush, telescoped or nested 2" laps at ends and interlocking or nested side laps, unless otherwise indicated.

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- B. Composite Steel Form Deck: Provide galvanized composite floor deck units with deck configurations, metal thickness, depth, and section properties as shown with integral embossing or raised pattern to furnish mechanical bond with concrete. Comply with SDI "Specification for Composite Steel Floor Deck."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Installer must examine areas and conditions under which metal decking is to be installed and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

3.2 INSTALLATION

- A. General: Install deck units and accessories in accordance with applicable specifications and commentary in SPI Publication No. 31, manufacturer's recommendations and final shop drawings, and as specified herein.
- B. Place deck units on supporting steel framework and adjust to final position with ends accurately aligned and bearing on supporting members before being permanently fastened. Do not stretch or contract side lap interlocks.
1. Place deck units in straight alignment for entire length of run of cells and with close alignment between cells at ends of abutting units.
 2. Place deck units flat and square, secured to adjacent framing without warp or excessive deflection.
 3. Install temporary shoring before placing deck panels if required to meet deflection criteria.
- C. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.
- D. Do not use floor or roof deck units for storage or working platforms until permanently secured.
- E. Fastening Deck Units:
1. Fasten composite floor deck units to steel supporting members by not less than 3/4" diameter fusion welds or elongated welds of equal strength, spaced not more than 12" o.c. with a minimum of 2 welds per unit at each support.

2. Tack weld or use machine screws at 4'-0" o.c. for fastening and closures.
- O. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work.
- P. Use welding Fitting: Cut and neatly fit deck units and accessories around other work projecting through or adjacent to the decking, as shown.
- H. Cutting and Fitting: Cut and neatly fit deck units and accessories around other work projecting through or adjacent to the decking, as shown.
- I. Reinforcement at Openings: Where deck openings are from 15" wide to 30" wide, and are not supported by structural members, weld a 1" x 1" x 1/4" steel angle to underside of deck at right angles to deck ribs. Extend angle 3 ribs beyond each side of opening and weld to bottom surface of each rib. Reinforce opening side parallel to deck ribs with a 12" wide, 20 gage steel sheet placed on top surface of decking, welded at each corner and at 12" o.c. along each side. Side reinforcing may be omitted when a roof sump pan is to be installed over the opening.
- J. Hanger Slots or Clips: Provide UL approved punched hanger slots between cells or flutes of lower element where floor deck units are to receive hangers for support of ceiling construction, air ducts, diffusers, or lighting fixtures.

Hanger clips designed to clip over male side lap joints of floor deck units may be used instead of hanger slots.

Locate slots or clips at not more than 14" o.c. in both directions, not over 9" from walls at ends, and not more than 12" from walls at sides, unless otherwise shown.

Provide manufacturer's standard hanger attachment devices.
- K. Joint Covers: Provide metal joint covers at abutting ends and changes in direction of floor deck units.
- L. Closure Strips: Provide metal closure strips at open uncovered ends and edges of roof decking, and in voids between decking and other construction. Weld into position to provide a complete decking installation.
- M. Touch-up Painting: After decking installation, wire brush, clean and paint scarred areas, welds and rust spots on top and bottom surfaces of decking units and supporting steel members.
- N. Touch-up galvanized surfaces with galvanizing repair paint applied in accordance with manufacturer's instructions.

- Q. Touch-up painted surfaces with same type of shop paint used on adjacent surfaces.

- R. In areas where shop-painted surfaces are to be exposed, apply touch-up paint to blend into adjacent surfaces.

END OF SECTION 053100

SECTION 054000 - COLD-FORMED STEEL FRAMING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to this section.
- B. Related Work Specified Elsewhere
 - 1. Section 017419 - Construction and Demolition Waste Management and Disposal.
 - 2. Section 018113 - Sustainable Design Requirements.
 - 3. Section 018119 - Construction Indoor Air Quality Requirements

1.2 DESCRIPTION OF WORK

- A. The extent of cold-formed framing is shown on the Drawings.
- B. Sustainable Design Requirements: The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.
- C. This section includes:
 - 1. Load-bearing wall framing.
 - 2. Floor joist framing.
 - 3. Roof rafter framing.
- D. Related work specified elsewhere.

1.3 QUALITY ASSURANCE

- A. Component Design: Compute structural properties of studs and joists in accordance with American Iron and Steel Institute (AISI) "Specification for the Design of Cold-Formed Steel Structural Members," Latest Edition.
- B. Welding: Use qualified welders and comply with American Welding Society (AWS) D1.3 "Structural Welding Code - Sheet Steel".
- C. Fire-Rated Assemblies: Where framing units are components of assemblies indicated for a fire-resistant rating, including those required for compliance with governing regulations,

provide units which have been approved by governing authorities having jurisdiction.

- D. Inspection: The Owner will engage the services of a qualified "Special Inspector" for this project. The Special Inspector, as a representative of the Owner, will confirm that the provisions of the current Building Code are complied with and will provide inspection and testing requirements, as necessary. Reports will be submitted on a regular basis and a Final Report compiled and submitted to the Owner and Town Building Department.
- E. Testing Agency Qualifications: Qualified according to ASTM E 529 for testing protocol.
- F. Component Installation: In-place components will be inspected to confirm compliance with size, gage and spacing requirements as well as bridging and cross brace requirements specified in the Contract Documents and in approved shop drawings.
- G. Attachments: Welds and mechanical fasteners will be visually inspected to confirm that Project requirements for spacing and size are met. Verify that attachment of light gage framing is in conformance with details shown in the Contract Documents or approved shop drawings. Attachments will be periodically inspected for tightness. Use mechanical fasteners whenever possible to avoid welding.

1.4 SUBMITTALS

- A. Product Data: Submit copies of manufacturer's product information and installation instructions for each item of cold-formed framing and accessories. Distribute one additional copy of installation instructions to the installer.
- B. Shop Drawings: Submit shop drawings (in electronic format) for components and installations not fully dimensioned or detailed in manufacturer's product data.
 - 1. Include placing drawings for all framing members and all prefabricated components showing size and gage designations, number, type, location and spacing. Indicate strapping, bracing, splices, bridging, stiffeners, accessories, connections, and details required for proper installation. Reproduced copies of Construction Drawings are not acceptable.
- C. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.

1.5 DELIVERY AND STORAGE

- A. Protect cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage and handling. Deliver to the project site in manufacturer's unopened containers or bundles fully identified with name, brand, type and grade. Store off the ground in a dry ventilated space or protect with suitable waterproof coverings.

PART 2 - PRODUCTS

2.1 COLD-FORMED STEEL FRAMING

- A. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated on Drawings.
- B. System Components: With each type of metal framing required provide manufacturer's standard steel runners (tracks), blocking, bridging, lintels, clip angles, shoes, reinforcements, and accessories as recommended by manufacturer for the applications indicated, as needed to provide a complete metal framing system.
- C. Certifications: Submit to the Special Inspector a statement from manufacturer certifying that materials and sections provided comply with the minimum requirements specified in the Contract Documents. Include certificates of compliance for mechanical fasteners.
 - 1. Provide certification that welders employed in the work of this project have satisfactorily passed AWS qualification tests within the previous 12 months.
- D. Materials and Finishes: For 16 gage and heavier units, fabricate cold-formed steel framing components of structural quality steel sheet with a minimum yield point of 50,000 psi: ASTM A 446, A 570, or A 611.
- E. For 18 gage and lighter units, fabricate cold-formed steel framing components of commercial quality steel sheet with a minimum yield point of 33,000 psi, ASTM A 446, A 570, or A 611.
- F. Provide galvanized finish to metal framing where indicated with ASTM A 525 for minimum G 60 coating.
- G. Provide prime coated finish with one coat of shop-applied red-oxide, zinc-chromate, or other similar rust-inhibitive primer for all other metal framing components not galvanized.
- H. "C" - Shaped Studs: Manufacturer's standard load-bearing steel studs of size, shape, gage and properties indicated with 1.5" minimum flange and flange return lip.
- I. "C" Shaped Joists and Rafters: Manufacturer's standard C-shape sections of size, shape, gage and properties indicated.
- J. Tracks: Gage and size shall match supported studs, joists, and/or rafters except as indicated otherwise.
- K. Provide anchors, clips and fasteners complying with the following specifications:
 - 1. Steel Shapes and Clips: ASTM A 36, zinc-coated by hot-dip process according to ASTM A 123.
 - 2. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel, hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc-coated by hot-dip process according to ASTM A 153, Class C.
 - 3. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI

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- 318 greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.
4. Power-actuated Fasteners: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
- L. Galvanizing Repair Paint: SSPC Paint 20 or MIL-P-20135B.
- M. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirement

2.2 FABRICATION

- A. General: Framing components may be prefabricated into panels prior to erection. Fabricate panels plumb, square, true to line and braced against racking with joints welded.
- B. Fastenings: Attach similar components by welding. Attach dissimilar components by welding, bolting, or screw fasteners, as standard with the manufacturers. Wire tying of framing components is not permitted.
- C. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

PART 3 EXECUTION

3.1 PREPARATION

- A. Pre-Installation Conference: Prior to the start of installation of cold-formed steel framing systems, meet at the project site with the installers of other work including door and window frames and mechanical and electrical work. Review areas of potential interference and conflicts, and coordinate layout and support provisions for interfacing work.
- B. Examine supporting substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Manufacturer's Instructions: Install cold-formed steel framing systems in accordance with AISI 200 and manufacturer's printed or written instructions and recommendations, unless otherwise indicated.

- B. Runner Tracks: Install continuous tracks sized to match studs. Align tracks accurately to the layout at base and tops of studs. Secure tracks as recommended by the stud manufacturer for the type of construction involved, except do not exceed 24" o.c. spacing for nail or power-driven fasteners, or 16" o.c. for other types of attachment. Provide fasteners at corners and ends of tracks.
- C. Set studs plumb, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar requirements.
- D. Where stud system abuts structural columns or walls, including masonry walls, anchor ends of stiffeners to supporting structure.
- E. Install supplementary framing, blocking and bracing in the metal framing system wherever walls or partitions are indicated to support fixtures, equipment, services, casework, heavy trim and furnishing, and similar work requiring attachment to the wall or partition. Where type of supplementary support is not otherwise indicated, comply with the stud manufacturer's recommendations and industry standards in each case, considering the weight or loading resulting from the item supported.
- F. Installation of Wall Stud System:
 - 1. Secure studs to top and bottom runner tracks by either welding or screw fastening at both inside and outside flanges.
 - a. Anchorage to supporting structure shall be designed to resist a lateral pressure of 25 psf in either direction unless otherwise indicated on the drawings.
 - 2. Frame wall openings larger than 2'-0" square with double stud at each jamb of frame except where more than 2 are either shown or indicated in manufacturer's instructions. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with stud shoes or by welding, and space jack studs same as full-height studs of the wall. Secure stud system all around to wall opening frame in the manner indicated.
 - 3. Frame both sides of expansion and control joints, as shown for the wall system, with a separate stud and do not bridge the joint with components of the stud system.
 - 4. All walls to have horizontal stiffeners and bridging. It shall be installed and properly attached by welding or screwing at each intersection before any studs are loaded.
 - 5. Install horizontal stiffeners in stud system, wall bridging for walls up to 10'-0" height, two rows spaced equally. For walls, over 10'-0" height - bridging spaced (vertical distance) at 3'-4 "o.c. maximum. Weld at each intersection.
- G. Installation of Joists and Rafters: Install level and plumb, complete with bracing and reinforcing as indicated on drawings. Provide not less than 1-1/2" end bearing.

1. Reinforce ends with end clips, steel hangers, steel angle clips, steel stud section, or as otherwise recommended by joist manufacturer and as shown on contract drawings.
 2. Where required, reinforce joists and rafters at interior supports with single short length of joist section located directly over interior support, snap-on shoe, 30% side-piece lapped reinforcement, or other method recommended by joist manufacturer.
 3. Secure joists and rafters to interior support systems to prevent lateral movement of bottom flange. Joist and rafter anchorage shall be designed to resist a superimposed pressure of 25 psf in either direction, vertically unless otherwise indicated on drawings.
- H. Field Painting: Touch-up shop-applied protective coatings damaged during handling and installation. Use compatible primer for prime coated surface; use galvanizing repair paint for galvanized surfaces.
- I. Install miscellaneous joist framing and connections including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors and fasteners to provide a complete and stable framing assembly.

END OF SECTION 054000

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Steel framing and supports for operable partitions.
2. Steel framing and supports for overhead doors and grilles.
3. Steel framing and supports for countertops.
4. Steel framing and supports for mechanical and electrical equipment.
5. Steel framing and supports for applications where framing and supports are not specified in other Sections.
6. Elevator machine hoist beams.
7. Steel shapes for supporting elevator door sills.
8. Slotted channel framing.
9. Metal ladders.
10. Miscellaneous steel trim including steel angle corner guards.
11. Metal bollards.
12. Downspout guards.
13. Metal downspout boots.
14. Loose bearing and leveling plates for applications where they are not specified in other Sections.

- B. Products furnished, but not installed, under this Section include the following:

1. Loose steel lintels.
2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

- C. Related Requirements:

1. Section 017419 - Construction and Demolition Waste Management and Disposal
2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.

3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
4. Section 042000 "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
5. Section 051200 "Structural Steel Framing" for steel framing, supports, elevator machine beams, hoist beams, divider beams, door frames, and other steel items attached to the structural-steel framing.
6. Section 057300 "Decorative Metal Railings" for cable assemblies associated with railings.
7. Section 083326 "Overhead Coiling Grilles" for coiling counter grille.
8. Section 102239 "Folding Panel Partition" for operable partition.
9. Section 123623 "Plastic Laminate Countertops" for countertop construction.
10. Section 133419 "Metal Building Systems" for metal components provided by pre-manufactured metal building provider.
11. Section 142123 "Machine Room-less Electric Traction Passenger Elevators" for elevator.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For the following:
 1. Fasteners.
 2. Shop primers.
 3. Shrinkage-resisting grout.

4. Slotted channel framing.
5. Manufactured metal ladders.
6. Metal bollards.
7. Downspout guards.
8. Metal downspout boots.

B. Sustainable Design Submittals:

1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
2. Environmental Product Declaration (EPD): For each product, where indicated.

C. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:

1. Steel framing and supports for operable partitions.
2. Steel framing and supports for overhead grilles.
3. Steel framing and supports for countertops.
4. Steel framing and supports for mechanical and electrical equipment.
5. Steel framing and supports for applications where framing and supports are not specified in other Sections.
6. Elevator machine hoist beam.
7. Steel shapes for supporting elevator door sills.
8. Metal ladders.
9. Miscellaneous steel trim including steel angle corner guards.
10. Metal bollards.

D. Engineered Submittal: For ladders, including analysis verifying compliance with requirements. Submittal shall include details of ladder assembly and fabrication, as well as mounting to substrates.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer's experience with providing delegated-design engineering services of the kind indicated, including documentation that engineer is licensed in the jurisdiction in which Project is located.
- B. Mill Certificates: Signed by stainless steel manufacturers, certifying that products furnished comply with requirements.
- C. Welding certificates.
- D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- E. Research Reports: For post-installed anchors.

1.7 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:
1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
 3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design ladders.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.3 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- C. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- D. Stainless Steel Sheet, Strip, and Plate: ASTM A240/A240M or ASTM A666, Type 304.

- E. Stainless Steel Bars and Shapes: ASTM A276/A276M, Type 304.
- F. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.
- G. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.
- H. Zinc-Coated Steel Wire Rope: ASTM A741.
 - 1. Wire Rope Fittings: Hot-dip galvanized-steel connectors with capability to sustain, without failure, a load equal to minimum breaking strength of wire rope with which they are used.
- I. Stainless Steel Wire Rope: Wire rope manufactured from stainless steel wire complying with ASTM A492, Type 316.
 - 1. Wire Rope Fittings: Stainless steel connectors, Type 316, with capability to sustain, without failure, a load equal to minimum breaking strength of wire rope with which they are used.
- J. Steel Prestressing Strand: ASTM A416/A416M, Grade 270, low-relaxation, seven-wire, with 0.9-lb/sq. ft. zinc coating.
 - 1. Steel Prestressing Strand Fittings: Hot-dip galvanized-steel anchors and connectors with capability to sustain, without failure, a load equal to minimum breaking strength of steel prestressing strand with which they are used.
- K. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
 - 1. Size of Channels: 1-5/8 by 1-5/8 inches unless otherwise indicated.
 - 2. Material: Cold-rolled steel, ASTM A1008/A1008M, commercial steel, Type B, except where indicated to be structural steel, Grade 33; 0.0966-inch minimum thickness; unfinished where not exposed to public view. Coated with rust-inhibitive, baked-on, acrylic enamel where exposed to public view.
- L. Cast Iron: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.
- M. Aluminum Plate and Sheet: ASTM B209, Alloy 6061-T6.
- N. Aluminum Extrusions: ASTM B221, Alloy 6063-T6.
- O. Aluminum-Alloy Rolled Tread Plate: ASTM B632/B632M, Alloy 6061-T6.
- P. Aluminum Castings: ASTM B26/B26M, Alloy 443.0-F.

2.4 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
 - 1. Provide stainless steel fasteners for fastening aluminum or stainless steel.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.
- C. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 3, heavy-hex steel structural bolts; ASTM A563, Grade DH3, heavy-hex carbon-steel nuts; and where indicated, flat washers.
- D. Stainless Steel Bolts and Nuts: Regular hexagon-head annealed stainless steel bolts, ASTM F593; with hex nuts, ASTM F594; and, where indicated, flat washers; Alloy Group 1.
- E. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563; and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- F. Anchors, General: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing in accordance with ASTM E488/E488M, conducted by a qualified independent testing agency.
- G. Cast-in-Place Anchors in Concrete: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329/F2329M.
- H. Post-Installed Anchors: Chemical anchors.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
 - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless steel bolts, ASTM F593, and nuts, ASTM F594.
- I. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B633, Class Fe/Zn 5, as needed for fastening to inserts.

2.5 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 099123 "Interior Painting."
- B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- D. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- E. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained concrete with a minimum 28-day compressive strength of 3000 psi.

2.6 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.7 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 - 1. Fabricate units from slotted channel framing where indicated.
 - 2. Furnish inserts for units installed after concrete is placed.
- C. Fabricate supports for operable partitions from continuous steel beams of sizes indicated or as recommended by partition manufacturer with attached bearing plates, anchors, and braces as indicated or as recommended by partition manufacturer. Drill bottom of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.

2.8 METAL LADDERS

- A. General:
 - 1. For elevator pit ladders, comply with ASME A17.1/CSA B44.
- B. Steel Ladders:
 - 1. Space siderails 16 inches apart unless otherwise indicated.
 - 2. Siderails: Continuous, 1/2-by-2-1/2-inch steel flat bars, with eased edges.
 - 3. Rungs: 3/4-inch-diameter or 3/4-inch-square, steel bars.
 - 4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
 - 5. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.
 - 6. Support each ladder at top and bottom with welded or bolted steel brackets.
 - 7. Galvanize ladders, including brackets.

2.9 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
 - 1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
- C. Galvanize exterior miscellaneous steel trim.

2.10 METAL BOLLARDS

- A. Fabricate metal bollards from steel shapes, as indicated.
 - 1. Cap bollards with 1/2-inch-thick, steel plate with flat, beveled top.
- B. Steel bollards to be hot-dipped galvanized.

2.11 DOWNSPOUT GUARDS

- A. Fabricate downspout guards from 3/8-inch-thick by 12-inch-wide, steel plate, bent to fit flat against the wall at both ends and to fit around pipe with 2-inch clearance between pipe and pipe guard. Drill each end for two 3/4-inch anchor bolts.
 - 1. At split face CMU, carefully grind surface as required for guard to sit flat on CMU. Only grind at mating surface.
- B. Hot-dip galvanize steel downspout guards.

2.12 METAL DOWNSPOUT BOOTS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. J.R. Hoe & Sons Inc.
 - 2. Neenah Foundry Company.
 - 3. Jay R. Smith Manufacturing Company
- B. Source Limitations: Obtain downspout boots from single source from single manufacturer.
- C. Provide downspout boots made from cast iron in heights indicated with inlets of size and shape to suit downspouts. Provide units with flanges and holes for countersunk anchor bolts.

1. Outlet: Vertical, to discharge into pipe where piped connection indicated. At 35 degrees from horizontal, to discharge onto splash block where so indicated.

D. Cast-iron downspout boots to be factory finished, black.

2.13 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize bearing and leveling plates.
- C. Prime plates with zinc-rich primer.

2.14 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.15 GENERAL FINISH REQUIREMENTS

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.16 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
- B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean galvanized surfaces of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
- C. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, or masonry, or unless otherwise indicated.
 1. Shop prime with primers specified in Section 099123 "Interior Painting" unless zinc-rich primer is indicated.
- D. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
 1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 3. Items Indicated to Receive Primers Specified in Section 099600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 4. Other Steel Items: SSPC-SP 3, "Power Tool Cleaning."
 5. Galvanized-Steel Items: SSPC-SP 16, "Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals."
- E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for operable partitions, overhead doors and overhead grilles securely to, and rigidly brace from, building structure.

3.3 INSTALLATION OF METAL BOLLARDS

- A. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.

3.4 INSTALLATION OF DOWNSPOUT GUARDS

- A. Provide downspout guards at exposed vertical downspouts at garage building at locations indicated on Drawings. Install by bolting to wall with chemical anchors. Provide four 3/4-inch bolts at each pipe guard. Mount pipe guards with top edge 26 inches above driving surface.
 - 1. At split-face CMU, grind mating surface smooth as required for proper seating of guard to CMU.

3.5 INSTALLATION OF BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with shrinkage-resistant grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.6 REPAIRS

- A. Touchup Painting:
 - 1. Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - a. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
 - 2. Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 099123 "Interior Painting."

- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION 055000

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SECTION 055113 - METAL PAN STAIRS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Preassembled steel stairs with concrete-filled treads.
2. Steel tube railings and guards attached to metal stairs.
3. Steel tube handrails attached to walls adjacent to metal stairs.

B. Related Requirements:

1. Section 017419 - Construction and Demolition Waste Management and Disposal
2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
4. Section 033000 "Cast-in-Place Concrete" for concrete requirements.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.

- B. Coordinate installation of anchorages for metal stairs, railings, and guards.
 - 1. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry.
 - 2. Deliver such items to Project site in time for installation.
- C. Coordinate locations of hanger rods and struts with other work so they do not encroach on required stair width and are within fire-resistance-rated stair enclosure.
- D. Schedule installation of railings and guards so wall attachments are made only to completed walls.
 - 1. Do not support railings and guards temporarily by any means that do not satisfy structural performance requirements.

1.5 ACTION SUBMITTALS

- A. Product Data: For metal pan stairs and the following:
 - 1. Shop primer products.
 - 2. Handrail wall brackets.
 - 3. Grout.
- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Shop Drawings:
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Indicate sizes of metal sections, thickness of metals, profiles, holes, and field joints.
 - 3. Include plan at each level.
 - 4. Indicate locations of anchors, weld plates, and blocking for attachment of wall-mounted handrails.
 - 5. Indicate profile and dimensions of precast terrazzo treads.
 - 6. Indicate profile and dimensions of epoxy-resin-filled treads.
- A. Engineered Submittal: For stairs, railings and guards, including analysis verifying compliance with requirements. Submittal shall include details of stair, railing and guard assembly and fabrication, as well as mounting to substrates.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer's experience with providing delegated-design engineering services of the kind indicated, including documentation that engineer is licensed in the State in which Project is located.
- B. Welding certificates.
- C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. 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."

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification.
 - 1. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers.
 - 2. Protect steel members and packaged materials from corrosion and deterioration.
 - 3. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures.
 - a. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design stairs, railings and guards, including attachment to building construction.

- B. Structural Performance of Stairs: Metal stairs shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
1. Uniform Load: 100 lbf/sq. ft.
 2. Concentrated Load: 300 lbf applied on an area of 4 sq. in.
 3. Uniform and concentrated loads need not be assumed to act concurrently.
 4. Stair Framing: Capable of withstanding stresses resulting from railing and guard loads in addition to loads specified above.
 5. Limit deflection of treads, platforms, and framing members to $L/360$ or 1/4 inch, whichever is less.
- C. Structural Performance of Railings and Guards: Railings and guards, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 2. Infill of Guards:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
 - b. Infill load and other loads need not be assumed to act concurrently.
 3. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- D. Seismic Performance of Stairs: Metal stairs shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
1. Criteria: As indicated on drawings.

2.3 METALS

- A. Metal Surfaces: Provide materials with smooth, flat surfaces unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
1. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

- C. Steel Pipe for Railings and Guards: ASTM A53/A53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
 - 1. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- D. Uncoated, Cold-Rolled Steel Sheet: ASTM A1008/A1008M, either commercial steel, Type B, or structural steel, Grade 25, unless another grade is required by design loads; exposed.
 - 1. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- E. Uncoated, Hot-Rolled Steel Sheet: ASTM A1011/A1011M, either commercial steel, Type B, or structural steel, Grade 30, unless another grade is required by design loads.
 - 1. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

2.4 FASTENERS

- A. General: Provide zinc-plated fasteners with coating complying with ASTM B633.
- B. Fasteners for Anchoring Railings and Guards to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings and guards to other types of construction indicated and capable of withstanding design loads.
- C. Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.
- D. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563; and, where indicated, flat washers.
 - 1. Provide mechanically deposited or hot-dip, zinc-coated anchor bolts for stairs indicated to be shop primed with zinc-rich primer.
- E. Post-Installed Anchors: Chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E488/E488M, conducted by a qualified independent testing agency.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.

2.5 MISCELLANEOUS MATERIALS

- A. Handrail Wall Brackets: Cast nickel-silver, Cast bronze or Cast stainless steel, center of rail 2-1/2 inches from face of wall.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. Blum, Julius & Co., Inc.
- b. The Wagner Companies.
- c. King Architectural Metals

B. Welding Electrodes: Comply with AWS requirements.

C. Shop Primers: Provide primers that comply with Section 099123 "Interior Painting."

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

E. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout; recommended by manufacturer for interior use; noncorrosive and nonstaining; mixed with water to consistency suitable for application and a 30-minute working time.

2.6 FABRICATION, GENERAL

A. Provide complete stair assemblies, including metal framing, hangers, struts, railings and guards, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.

1. Join components by welding unless otherwise indicated.
2. Use connections that maintain structural value of joined pieces.

B. Assemble stairs, railings, and guards in shop to greatest extent possible.

1. Disassemble units only as necessary for shipping and handling limitations.
2. Clearly mark units for reassembly and coordinated installation.

C. Cut, drill, and punch metals cleanly and accurately.

1. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated.
2. Remove sharp or rough areas on exposed surfaces.

D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

E. Form exposed work with accurate angles and surfaces and straight edges.

F. Weld connections to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. Weld exposed corners and seams continuously unless otherwise indicated.
 5. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #2 - Completely sanded joint with some undercutting and pinholes okay.
- G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible.
1. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated.
 2. Locate joints where least conspicuous.
 3. Fabricate joints that will be exposed to weather in a manner to exclude water.
 4. Provide weep holes where water may accumulate internally.

2.7 FABRICATION OF STEEL-FRAMED STAIRS

- A. NAAMM Stair Standard: Comply with NAAMM AMP 510, "Metal Stairs Manual," for Commercial Class, unless more stringent requirements are indicated.
- B. Stair Framing:
1. Fabricate stringers of steel plates or steel channels or steel rectangular tubes.
 - a. Stringer Size: As required to comply with "Performance Requirements" Article.
 - b. Provide closures for exposed ends of channel and rectangular tube stringers.
 - c. Finish: Shop primed and Painted.
 2. Construct platforms of steel plate or channel or rectangular tube headers and miscellaneous framing members as required to comply with "Performance Requirements" Article.
 - a. Provide closures for exposed ends of channel and rectangular tube framing.
 - b. Finish: Shop primed and Painted.
 3. Weld or bolt stringers to headers; weld or bolt framing members to stringers and headers. If using bolts, fabricate and join so bolts are not exposed on finished surfaces.
 4. Where masonry walls support metal stairs, provide temporary supporting struts designed for erecting steel stair components before installing masonry.
- C. Metal Pan Stairs: Form risers, subtread pans, and subplatforms to configurations shown from steel sheet of thickness needed to comply with performance requirements, but not less than 0.067 inch.
1. Steel Sheet: Uncoated, cold-rolled steel sheet.

2. Directly weld metal pans to stringers; locate welds on top of subtreads where they will be concealed by concrete fill. Do not weld risers to stringers.
3. Attach risers and subtreads to stringers with brackets made of steel angles or bars. Weld brackets to stringers and attach metal pans to brackets by welding, riveting, or bolting.
4. Shape metal pans to include nosing integral with riser.
5. At Contractor's option, provide stair assemblies with metal pan subtreads filled with reinforced concrete during fabrication.
6. Provide subplatforms of configuration indicated or, if not indicated, the same as subtreads. Weld subplatforms to platform framing.

2.8 FABRICATION OF STAIR RAILINGS AND GUARDS

- A. Fabricate railings and guards to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of member, post spacings, wall bracket spacing, and anchorage, but not less than that needed to withstand indicated loads.
 1. Rails and Posts: 1-5/8-inch-diameter top and bottom rails and 1-1/2-inch-square posts.
 2. Intermediate Rails Infill: 1-5/8-inch-diameter intermediate rails spaced to provide less than 4 inches clear.
- B. Welded Connections: Fabricate railings and guards with welded connections.
 1. Cope components at connections to provide close fit, or use fittings designed for this purpose.
 2. Weld all around at connections, including at fittings.
 3. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 4. Obtain fusion without undercut or overlap.
 5. Remove flux immediately.
 6. Finish welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #2 - Completely sanded joint, some undercutting and pinholes are okay as shown in NAAMM AMP 521.
- C. Form changes in direction of railings and guards as follows:
 1. By bending or by inserting prefabricated elbow fittings.
- D. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- E. Close exposed ends of railing and guard members with prefabricated end fittings.
- F. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated.
 1. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.
- G. Connect posts to stair framing by direct welding unless otherwise indicated.

- H. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnecting components and for attaching to other work.
 - 1. Furnish inserts and other anchorage devices for connecting to concrete or masonry work.
 - 2. For nongalvanized railings and guards, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors embedded in exterior masonry and concrete construction.
 - 3. Provide type of bracket with predrilled hole for exposed bolt anchorage] and that provides 1-1/2-inch clearance from inside face of handrail to finished wall surface.
- I. Fillers: Provide fillers made from steel plate, or other suitably crush-resistant material, where needed to transfer wall bracket loads through wall finishes to structural supports.
 - 1. Size fillers to suit wall finish thicknesses and to produce adequate bearing area to prevent bracket rotation and overstressing of substrate.

2.9 FINISHES

- A. Finish metal stairs after assembly.
- B. Preparation for Shop Priming: Prepare uncoated, ferrous-metal surfaces to comply with SSPC-SP 3, "Power Tool Cleaning."
- C. Apply shop primer to uncoated surfaces of metal stair components, except those with galvanized finishes and those to be embedded in concrete or masonry unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify elevations of floors, bearing surfaces and locations of bearing plates, and other embedments for compliance with requirements.
 - 1. For wall-mounted railings, verify locations of concealed reinforcement within gypsum board and plaster assemblies.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF METAL PAN STAIRS

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction.

1. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.
- C. Install metal stairs by welding stair framing to steel structure or to weld plates cast into concrete unless otherwise indicated.
 1. Grouted Baseplates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates.
 - a. Clean bottom surface of plates.
 - b. Set plates for structural members on wedges, shims, or setting nuts.
 - c. Tighten anchor bolts after supported members have been positioned and plumbed.
 - d. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - e. Promptly pack grout solidly between bearing surfaces and plates so no voids remain.
 - 1) Neatly finish exposed surfaces; protect grout and allow to cure.
 - 2) Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- E. Fit exposed connections accurately together to form hairline joints.
 1. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.
 2. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
 3. Comply with requirements for welding in "Fabrication, General" Article.
- F. Place and finish concrete fill for treads and platforms to comply with Section 033000 "Cast-in-Place Concrete."

3.3 INSTALLATION OF RAILINGS AND GUARDS

- A. Adjust railing and guard systems before anchoring to ensure matching alignment at abutting joints with tight, hairline joints.
 1. Space posts at spacing indicated or, if not indicated, as required by design loads.
 2. Plumb posts in each direction, within a tolerance of 1/16 inch in 3 feet.
 3. Align rails and guards so variations from level for horizontal members and variations from parallel with rake of stairs for sloping members do not exceed 1/4 inch in 12 feet.

4. Secure posts, rail ends, and guard ends to building construction as follows:
 - a. Anchor posts to steel by welding or bolting to steel supporting members.
 - b. Anchor handrail and guard ends to concrete and masonry with steel round flanges welded to rail and guard ends and anchored with post-installed anchors and bolts.

B. Attach handrails to wall with wall brackets.

1. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
2. Secure wall brackets to building construction as required to comply with performance requirements and as follows.
 - a. For concrete and solid masonry anchorage, use chemical anchors.
 - b. For hollow masonry anchorage, use hollow masonry anchors or toggle bolts as required to comply with performance requirements.

3.4 REPAIR

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

END OF SECTION 055113

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SECTION 055213 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Steel Railings and Handrails indicated to be Color-Galvanized.

- B. Related Requirements:

- 1. Section 017419 - Construction and Demolition Waste Management and Disposal
 - 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
 - 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
 - 4. Section 055113 "Metal Pan Stairs" for steel tube railings associated with metal pan stairs.
 - 5. Section 057300 "Decorative Metal Railings" for ornamental railings fabricated from custom steel and cable infill.

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

- A. Product Data:

- 1. Manufacturer's product lines of mechanically connected railings.

2. Expanded metal infill panels.
3. Perforated metal infill panels.
4. Woven-wire mesh infill panels.
5. Fasteners.
6. Post-installed anchors.
7. Handrail brackets.
8. Shop primer.
9. Intermediate coats and topcoats.
10. Bituminous paint.
11. Nonshrink, nonmetallic grout.
12. Anchoring cement.
13. Metal finishes.
14. Paint products.

B. Sustainable Design Submittals:

1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
2. Laboratory Test Reports: For stains and liquid floor treatments, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

D. Samples for Initial Selection: For products involving selection of color, texture, or design.

E. Samples for Verification: For each type of exposed finish required.

1.5 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Product Test Reports: For tests on railings performed by a qualified testing agency, in accordance with ASTM E894 and ASTM E935.

C. Research Reports: For post-installed anchors, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect mechanical finishes on exposed surfaces of railings from damage by applying a strippable, temporary protective covering before shipping.

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication.

1.9 WARRANTY

- A. Provide hot-dip galvanizer's warranty for coatings that fail in materials or workmanship within specified warranty period. Failures include hot-dipped galvanized process with 10 percent or more visible rust and finish failing to meet the performance specifications.
- B. Warranty Period:
 - 1. Galvanizing Process: 20 years.
 - 2. Finish: 5 years.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.3 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

2.4 STEEL RAILINGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Hartford Wire Works, Windsor, CT
 - 2. Carrano's Railings and Welding, Hamden, CT
 - 3. Quality Welding, LLC, Bristol, CT
- B. Source Limitations: Obtain each type of railing from single source from single manufacturer.
- C. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- D. Tubing: ASTM A500 (cold formed) or ASTM A513, Type 5.
- E. Pipe: ASTM A53/A53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
 - 1. Provide color-galvanized finish for exterior installations and where indicated.
- F. Plates, Shapes, and Bars: ASTM A36/A36M.
- G. Cast Iron Fittings: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.

2.5 FASTENERS

- A. Fastener Materials:
 - 1. Hot-Dip Galvanized Railing Components: Type 304 stainless steel or hot-dip zinc-coated steel fasteners complying with ASTM A153/A153M or ASTM F2329/F2329M for zinc coating.
 - 2. Finish exposed fasteners to match appearance, including color and texture, of railings.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction and capable of withstanding design loads.

- C. Fasteners for Interconnecting Railing Components:
 - 1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
- D. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193.
 - 1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
 - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless steel bolts, ASTM F593, and nuts, ASTM F594.

2.6 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for metal alloy welded.
- B. Etching Cleaner for Galvanized Metal: Complying with MPI#25.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint, complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D. Bituminous Paint: Cold-applied asphalt emulsion, complying with ASTM D1187/D1187M.
- E. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout, complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- F. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.
 - 1. Water-Resistant Product: At exterior locations, provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.7 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations.

1. Clearly mark units for reassembly and coordinated installation.
 2. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately.
1. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated.
 2. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that are exposed to weather in a manner that excludes water.
1. Provide weep holes where water may accumulate.
 2. Locate weep holes in inconspicuous locations.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with welded connections unless otherwise indicated.
- H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove flux immediately.
 4. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #2 welds; good appearance, completely sanded joint, some undercutting and pinholes okay.
- I. Form changes in direction as follows:
1. By bending or by inserting prefabricated elbow fittings.
- J. Bend members in jigs to produce uniform curvature for each configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- K. Close exposed ends of hollow railing members with prefabricated cap and end fittings of same metal and finish as railings.
- L. Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
- M. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work.

1. Fabricate anchorage devices capable of withstanding loads imposed by railings.
 2. Coordinate anchorage devices with supporting structure.
- N. For railing posts set in concrete, provide stainless steel sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with metal plate forming bottom closure.

2.8 STEEL AND IRON FINISHES

- A. Manufacturers: The Basis of Design is established as the following products of Duncan Galvanizing, 69 Norman Street, Everett, MA, 02149, telephone 617-389-8440. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. Connecticut Galvanizing, Glastonbury, CT
 2. Valmont Coatings, Folsom, NJ
- B. Basis of design is Colorgalv Hot-dip galvanizing and factory-applied high-performance polyamide epoxy primer with factory-applied high performance aliphatic acrylic urethane topcoat for iron and steel fabrications.
- C. Hot-Dip Galvanizing: For steel exposed to the elements, weather or corrosive environments and other steel indicated to be galvanized, provide coating for iron and steel fabrications applied by the hot-dip process. Galvanizing bath shall contain special high-grade zinc and other earthly materials.
1. Basis of design is Duragalv
 2. Comply with ASTM A 123 for fabricated products and ASTM A 153 for hardware.
 3. Provide thickness of galvanizing specified in referenced standards.
 4. Fill vent holes after galvanizing if required, and grind smooth.
 5. All exposed galvanizing shall be blasted per SSPC SP16 to achieve a 1-3 mil profile. Inaccessible areas shall be abraded per SSPC SP2 or SP3 to achieve a 1-3 mil profile and to remove all runs, drips and sags.
 6. Galvanizing shall exhibit a rugosity (smoothness) of less than 25 microns when measured by a profilometer. This pertains to those elements that are less than 24 pounds per running foot. Profilometer shall be capable of operating in 1 micron increments.
- D. Primer over Galvanized Steel: Provide factory-applied polyamide epoxy prime coat over hot-dipped galvanized steel.
1. Basis-of-Design: PRIMERGALV.
 2. Primer shall be certified OTC/VOC compliant at less than 2.8 lbs/gal. and conform to EPA and local requirements.
 3. Apply primer within 12 hours after galvanizing or blasting at the same galvanizer's plant in a controlled environment meeting applicable environmental conditions and as recommended by the primer coating manufacturer. Primer shall have a one year re-coat window for application of finish coat.

4. Polyamide epoxy primer shall be applied at 4-6 mils DFT and meet or exceed the following performance criteria as stipulated by the coatings manufacturer:
 - a. Abrasion Resistance: ASTM D 4060 (CS17 Wheel, 1,000 grams load) 1kg load, 200 mg loss.
 - b. Adhesion: ASTM D 4541, 1050 psi.
 - c. Corrosion Weathering: ASTM D 5894, 13 cycles, 4,368 hours, 10 per ASTM D 714 for blistering; 7 per ASTM D 610 for rusting.
 - d. Direct Impact Resistance: ASTM D 2794, 160 in. lbs.
 - e. Flexibility: ASTM D 522, 180 degrees bend, 1 inch mandrel, Passes.
 - f. Pencil Hardness: ASTM D 3363, 3H.
 - g. Moisture Condensation Resistance: ASTM D 4585, 100 degrees F, 2000 hours, Passes no cracking or delamination.
 - h. Dry Heat Resistance: ASTM D 2485, 250 degrees F.
 - i. Accelerated Weathering: QUV- ASTM D 4587 QUV A 5000 Hours Passes.
 - j. Salt Fog Resistance: ASTM B 117, 5,600 hours No cracking or blisters.

- E. Topcoat: Provide factory applied aliphatic acrylic urethane topcoat in specified color and gloss range per approved samples.
 1. Topcoat shall be certified OTC/VOC compliant at less than 2.8 lbs/gal. and conform to EPA and local requirements.
 2. Topcoat shall be applied over primer per the manufacturer's recoat schedule at the same galvanizer's plant in a controlled environment meeting applicable environmental conditions as recommended by the coating manufacturer.
 3. Aliphatic acrylic urethane topcoat shall be applied at 4-6 mils DFT and meet or exceed the following performance criteria as stipulated by the coatings manufacturer:
 - a. Abrasion Resistance: ASTM D 4060, CS17 Wheel, 1,000 cycles 1 kg load, 87.1 mg loss.
 - b. Adhesion: ASTM D 4541, 1050 psi.
 - c. Direct Impact Resistance: ASTM D 2794, greater than 28 in. pounds.
 - d. Dry Heat Resistance: ASTM D 2485, 200 degrees F (93 C).
 - e. Salt Fog Resistance: ASTM B 117 9,000 hours, Rating 10 per ASTM D 714 for blistering, Rating 9 per ASTM D 610 for rusting.
 - f. Flexibility: ASTM D522, 180 degrees bend, 1/8 inch mandrel, Passes.
 - g. Pencil Hardness: ASTM D 3363, F.
 - h. Moisture Condensation Resistance: ASTM D 4585, 100 degrees F, 1000 hours, No blistering or delamination.
 - i. Corrosion Weathering: ASTM D 5894, 21 Cycles, 7056 Hours: Rating 10 per ASTM D714 for blistering. Rating 9 Per ASTM D 610 for Rusting.
 - j. Thermal Shock: ASTM D 2246, 15 cycles, Excellent.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to receive railings. Do not proceed until substrates are acceptable for attachment of railings.

3.2 APPLICATION OF FACTORY-APPLIED METAL COATINGS

- A. Galvanizing Application: Galvanize materials in accordance with specified standards and this specification. Galvanizing shall provide an acceptable substrate for applied coatings. The dry kettle process shall be used to eliminate any flux inclusions on the surface of the galvanized material.
- B. Prior to galvanizing, the steel shall be immersed in a pre-flux solution (zinc ammonium chloride). The pre-flux tank must be 12 to 14 Baumé density and contain less than 0.4 percent iron. Use of the wet kettle process is not acceptable. To provide the galvanized surface required, the following procedures shall be implemented:
 - 1. A monitoring recorder shall be utilized and inspected regularly to observe any variances in the galvanizing bath temperature.
 - 2. The pickling tanks shall contain hydrochloric acid with an iron content less than 8 percent and zinc content less than 3 percent. Titrations shall be taken weekly at a minimum.
 - 3. All chemicals and zinc shall be tested at least once a week to determine compliance with ASTM standards. All testing shall be done using atomic absorption spectrometry or x-ray fluorescence (XRF) equipment at a lab in the galvanizing plant.
- C. Finish coatings shall be applied under the following conditions.
 - 1. Minimum air temperature shall be 50 degrees F. Surface temperature of steel shall be 50 degrees to 120 degrees F and, in any event, be 5 degrees F higher than the dew point. Humidity shall be 85 percent maximum.
 - 2. The use of iron, steel shot, and aluminum oxide grit as a blast medium, and power wire brushes are not permitted.
 - 3. Surface of substrate shall be dry and free from dust, dirt, oil, grease or other contaminants. Coating and cure facility shall be maintained free of airborne dust and dirt until coatings are completely cured.

3.3 INSTALLATION, GENERAL

- A. Perform cutting, drilling, and fitting required for installing railings.
 - 1. Fit exposed connections together to form tight, hairline joints.

2. Install railings level, plumb, square, true to line; without distortion, warp, or rack.
 3. Set railings accurately in location, alignment, and elevation; measured from established lines and levels.
 4. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 5. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 6. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
1. Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- C. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.4 RAILING CONNECTIONS

- A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article, whether welding is performed in the shop or in the field.
- B. Expansion Joints: Install expansion joints at locations not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve, extending 2 inches beyond joint on either side; fasten internal sleeve securely to one side; and locate joint within 6 inches of post.

3.5 ANCHORING POSTS

- A. Anchor post using one of the following methods:
1. Use stainless steel pipe sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.
 2. Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.
- B. Leave anchorage joint exposed with 1/8-inch buildup, sloped away from post.

3.6 ATTACHING RAILINGS

- A. Anchor railing ends to concrete and masonry with flanges connected to railing ends and anchored to wall construction with anchors and bolts.

3.7 REPAIR

- A. Touch-Up and Repair: For damaged and field-welded metal coated surfaces, clean welds, bolted connections and abraded areas.
 - 1. For galvanized surfaces, apply organic zinc repair paint complying with requirements of ASTM A 780, modified to 95 percent zinc in dry film. Galvanizing repair paint shall have 85 percent zinc by weight. ZiRP by Duncan Galvanizing or a Zinc Rich Organic coating may be used. Thickness of applied galvanizing repair paint shall be not less than coating thickness required by ASTM A 123 or A 153 as applicable. Touch-up of galvanized surfaces with silver paint, brite paint, or aluminum paints is not acceptable.
 - 2. For factory-applied finish coatings, field-touch-up shall be performed by factory approved personnel for warranties to apply. Touch-up shall be such that repair is not visible from a distance of 6 feet. A touch-up repair kit and touchup instructions shall be provided to the Owner for each type of factory-applied finish upon request.

3.8 CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A780/A780M.

3.9 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period, so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 055213

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SECTION 055313 - BAR GRATINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes metal bar gratings and metal frames and supports for gratings.
- B. Related Requirements:
 - 1. Section 017419 - Construction and Demolition Waste Management and Disposal
 - 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
 - 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 COORDINATION

- A. Coordinate installation of anchorages for gratings, grating frames, and supports. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Clips and anchorage devices for gratings.
- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Shop Drawings: Include plans, sections, details, and attachments to other work.
- D. Design Data Submittal: For gratings, including manufacturers' published load tables.

1.6 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

1.7 QUALITY ASSURANCE

- A. 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."

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with gratings by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. All American Grating.
 - 2. Harsco Industrial IKG, a division of Harsco Corporation.
 - 3. Neenah Foundry Company.
 - 4. Ohio Gratings, Inc.

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Gratings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
1. Floors: Uniform load of 125 lbf/sq. ft. or concentrated load of 2000 lbf, whichever produces the greater stress.
 2. Areaway Grate: Uniform load of 60 lbf/sq. ft..
 3. Limit deflection to L/360 or 1/4 inch, whichever is less.

2.3 METAL BAR GRATINGS

- A. Metal Bar Grating Standards: Comply with NAAMM MBG 531, "Metal Bar Grating Manual."
- B. Welded Steel Grating at Areaway (north of Column Line 2 between D and E and at north, lower level entrance below bike racks):
1. Bearing Bar Spacing: 7/16 or 1/2 inch o.c.
 2. Bearing Bar Depth: 1-1/2 inches.
 3. Bearing Bar Thickness: 3/16 inch.
 4. Crossbar Spacing: 4 inches o.c.
 5. Grating Mark W-11-4 (1 x 3/16) STEEL: 1-by-3/16-inch bearing bars at 11/16 inch o.c., and crossbars at 4 inches o.c.
 6. Traffic Surface:
 - a. At Areaway: Plain
 - b. At Bike Rack: Knurled.
 7. Steel Finish: Hot-dip galvanized with a coating weight of not less than 1.8 oz./sq. ft. of coated surface.
 8. Size:
 - a. At Areaway: One piece to fit opening
 - b. At Bike Rack: Three equal pieces for ease of removal

2.4 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- B. Steel Bars for Bar Gratings: ASTM A36/A36M or steel strip, ASTM A1011/A1011M or ASTM A1018/A1018M.
- C. Wire Rod for Bar Grating Crossbars: ASTM A510.
- D. Uncoated Steel Sheet: ASTM A1011/A1011M, structural steel, Grade 30.
- E. Galvanized-Steel Sheet: ASTM A653/A653M, structural quality, Grade 33, with G90 coating.

2.5 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563 and, where indicated, flat washers.
- C. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563 and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- D. Post-Installed Anchors: Chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E488/E488M, conducted by a qualified independent testing agency.

2.6 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

2.7 FABRICATION

- A. Shop Assembly: Fabricate grating sections in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch material cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form from materials of size, thickness, and shapes indicated, but not less than that needed to support indicated loads.
- D. Fit exposed connections accurately together to form hairline joints.
- E. Welding: Comply with AWS recommendations and the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.

- F. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space the anchoring devices to secure gratings, frames, and supports rigidly in place and to support indicated loads.
- G. Removable Grating Sections: Fabricate with banding bars attached by welding to entire perimeter of each section. Include anchors and fasteners of type indicated or, if not indicated, as recommended by manufacturer for attaching to supports.
 - 1. Provide no fewer than four weld lugs for each heavy-duty grating section, with each lug shop welded to two bearing bars.
- H. Do not notch bearing bars at supports to maintain elevation.

2.8 GRATING FRAMES AND SUPPORTS

- A. Fabricate from metal shapes, plates, and bars of welded construction to sizes, shapes, and profiles indicated and as necessary to receive gratings. Miter and weld connections for perimeter angle frames. Cut, drill, and tap units to receive hardware and similar items.
 - 1. Unless otherwise indicated, fabricate from same basic metal as gratings.
 - 2. Equip units indicated to be cast into concrete or built into masonry with integrally welded anchors. Unless otherwise indicated, space anchors 24 inches o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches wide by 1/4 inch thick by 8 inches long.
- B. Galvanize steel frames and supports in the following locations:
 - 1. Exterior.

2.9 STEEL FINISHES

- A. Finish gratings, frames, and supports after assembly.
- B. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Factory size grating for fitting required for installing gratings. Set units accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

- B. Provide temporary bracing or anchors in formwork for items that are to be built into concrete or masonry.
- C. Fit exposed connections accurately together to form hairline joints.
 - 1. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

3.2 INSTALLING METAL BAR GRATINGS

- A. General: Install gratings to comply with recommendations of referenced metal bar grating standards that apply to grating types and bar sizes indicated, including installation clearances and standard anchoring details.
- B. Attach removable units to supporting members with type and size of clips and fasteners indicated or, if not indicated, as recommended by grating manufacturer for type of installation conditions shown.

3.3 ADJUSTING AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION 055313

SECTION 057300 - DECORATIVE METAL RAILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Stainless steel decorative railings.
2. Steel and iron decorative railings.
3. Wood rails installed in decorative metal railings

- B. Related Requirements:

1. Section 017419 - Construction and Demolition Waste Management and Disposal
2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
4. Section 055213 "Pipe and Tube Railings" for nonornamental railings fabricated from pipes and tubes.
5. Section 099300 "Staining and Transparent Finishing" for finish on wood components of decorative metal railings.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 COORDINATION AND SCHEDULING

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible.
- B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver items to Project site in time for installation.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

- A. Product Data:
 - 1. Manufacturer's product lines of decorative metal railings assembled from standard components.
 - 2. Stainless steel cable and cable fittings.
 - 3. Fasteners.
 - 4. Post-installed anchors.
 - 5. Handrail brackets.
 - 6. Wood rails.
 - 7. Bituminous paint.
 - 8. Nonshrink, nonmetallic grout.
 - 9. Anchoring cement.
 - 10. Metal finishes.
- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
 - 2. Chain of Custody: Provide affidavit confirming wood products sourced through CT Department of Energy and Environmental Protection's Portland, CT Mill have been received and are the products used for this project.
- C. Shop Drawings: Include plans, elevations, sections, and attachment details.
- D. Samples for Initial Selection: For products involving selection of color, texture, or design, including mechanical finishes.

- E. Samples for Verification: For each type of exposed finish required.
 - 1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters
 - 2. Fittings, end caps, and brackets.
 - 3. Welded connections.
 - 4. Cable and cable hardware and connections.
 - 5. Assembled Sample of railing system, made from full-size components, including top rail, post, handrail, and guard infill. Sample need not be full height.
 - a. Show method of connecting and finishing members at intersections.

1.7 INFORMATIONAL SUBMITTALS

- A. Mill Certificates: Signed by manufacturers of stainless-steel products, certifying that products furnished comply with requirements.
- B. Welding certificates.
- C. Product Test Reports: For tests on railings performed by a qualified testing agency, in accordance with ASTM E894 and ASTM E935.
- D. Research Reports: For post-installed anchors, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.
- E. Preconstruction test reports.

1.8 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 - 1. Build mockups for each form and finish of railing, consisting of two posts, top rail, infill area, and anchorage system components that are full height and are not less than 48 inches in length.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect mechanical finishes on exposed surfaces of railings from damage by applying a strippable, temporary protective covering before shipping.

1.10 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. LEED Performance Requirements: For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements
- B. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Infill of Guards:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
 - b. Infill load and other loads need not be assumed to act concurrently.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior railings by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.

2.3 STEEL AND IRON DECORATIVE RAILINGS

- A. Posts to be hot-dipped galvanized steel, as detailed.

- B. Source Limitations: Obtain steel decorative railing components from single source from single manufacturer.
- C. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- D. Plates, Shapes, and Bars: ASTM A36/A36M.
- E. Stainless Steel Cable and Cable Fittings:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. C. Sherman Johnson Co., Inc., East Haddam, CT
 - b. Feeny Wire Rope & Rigging., Watertown, MA
 - c. Hayn Enterprises, LLC., Rocky Hill, CT
 - d. Loos & Co. Inc., Pomfret, CT
 - e. Ronstan International Inc., Portsmouth, RI
 - 2. Cable: 1-by-19 wire cable made from wire complying with ASTM A492, Type 316.
 - 3. Cable Diameter: 3/16 inch.
 - 4. Cable Fittings: Connectors of types indicated, fabricated from stainless steel, and with capability to sustain, without failure, a load equal to minimum breaking strength of cable with which they are used.
 - a. At Take-up End of Cable: Button and Swage Turnbuckle to be machine swaged, with open length of 11 1/2" and closed length of 8 1/4".
 - b. At Fixed End of Cable: Button Terminal, Machine swaged, 2 1/2" long.

2.4 FASTENERS

- A. Fastener Materials:
 - 1. Stainless Steel Railing Components: Type 304 stainless steel fasteners.
 - 2. Hot-Dip Galvanized-Steel Railing Components: Type 304 stainless steel or hot-dip zinc-coated steel fasteners complying with ASTM A153/A153M or ASTM F2329/F2329M for zinc coating.
 - 3. Dissimilar Metal Railing Components: Type 304 stainless steel fasteners.
 - 4. Finish exposed fasteners to match appearance, including color and texture, of railings.
- B. Fasteners for Anchoring to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction and capable of withstanding design loads.
- C. Provide concealed fasteners for interconnecting railing components and for attaching railings to other work unless otherwise indicated.

D. Post-Installed Anchors: Chemical anchor fastener systems with working capacity greater than or equal to the design load, in accordance with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC308.

1. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless steel bolts, ASTM F593 and nuts, ASTM F594.

2.5 MISCELLANEOUS MATERIALS

A. Handrail Brackets: Cast stainless steel center of handrail 2-1/2 inches from face of railing or wall.

1. Provide cast-metal brackets with flange tapped for concealed anchorage to threaded hanger bolt.

B. Wood Rails:

1. Wood for use in railings to be furnished by CT DEEP, Portland Mill. Material will be dressed to required cross-section and furnished long for fitting, finishing and installation by the Contractor.
2. The Contractor shall finish wood, as follows:
 - a. Staining: As selected by Architect from manufacturer's full range, in accordance with Section 099300 "Staining and Transparent Finishes".
 - b. Profile: As detailed.
3. Wood: Wood products for railings sourced through CT Department of Energy and Environmental Protection's Portland, CT Mill.
4. Hardwood rails complying with Section 064023 "Interior Architectural Woodwork."

C. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

1. For railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

D. Etching Cleaner for Galvanized Metal: Complying with MPI#25.

E. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

G. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.6 FABRICATION

- A. Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations.
 - 1. Clearly mark units for reassembly and coordinated installation.
 - 2. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately.
 - 1. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated.
 - 2. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that will be exposed to weather in a manner to exclude water.
 - 1. Provide weep holes where water may accumulate.
 - 2. Locate weep holes in inconspicuous locations.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with connections as indicated.
- H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove flux immediately.
 - 4. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #1 welds; ornamental quality with no evidence of a welded joint.
- I. Mechanical Connections: Connect members with concealed mechanical fasteners and fittings.
 - 1. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
 - 2. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.
- J. Form changes in direction as follows:
 - 1. As detailed.

- K. Provide inserts and other anchorage devices for connecting railings to concrete Work.
 - 1. Fabricate anchorage devices capable of withstanding loads imposed by railings.
 - 2. Coordinate anchorage devices with supporting structure.
- L. Stainless Steel Cable Guard Infill: Fabricate cable guard infill assemblies in the shop to field-measured dimensions with fittings machine swaged.
 - 1. Minimize amount of turnbuckle take-up used for dimensional adjustment, so maximum amount is available for tensioning cable.
 - 2. Tag cable assemblies and fittings to identify installation locations and orientations for coordinated installation.
- M. Toe Boards: Where indicated on Drawings, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.

2.7 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.
- C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

2.8 STAINLESS STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1. Run grain of directional finishes with long dimension of each piece.
 - 2. When polishing is completed, passivate and rinse surfaces.
 - 3. Remove embedded foreign matter and leave surfaces chemically clean.

2.9 STEEL AND IRON FINISHES

- A. Galvanized Railings:
 - 1. Hot-dip galvanize exterior steel and iron railings, including hardware, after fabrication.

2. Comply with ASTM A123/A123M for hot-dip galvanized railings.
 3. Comply with ASTM A153/A153M for hot-dip galvanized hardware.
 4. Do not quench or apply post-galvanizing treatments that might interfere with paint adhesion.
 5. Fill vent and drain holes that are exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
- B. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Perform cutting, drilling, and fitting required for installing railings.
1. Fit exposed connections together to form tight, hairline joints.
 2. Install railings level, plumb, square, true to line; without distortion, warp, or rack.
 3. Set railings accurately in location, alignment, and elevation; measured from established lines and levels.
 4. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 5. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 6. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
1. Coat concealed surfaces of that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- C. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.2 RAILING CONNECTIONS

- A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws, using plastic cement filler colored to match finish of railings.

- B. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article, whether welding is performed in the shop or in the field.
- C. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve, extending 2 inches beyond joint on either side; fasten internal sleeve securely to one side; and locate joint within 6 inches of post.

3.3 ATTACHING RAILINGS

- A. Anchor railing ends to concrete as detailed.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections and to prepare test reports. Payment for these services will be made by Owner.
- B. Extent and Testing Methodology: Testing agency will randomly select completed railing assemblies for testing that are representative of different railing designs and conditions in the completed Work. Test railings in accordance with ASTM E894 and ASTM E935 for compliance with performance requirements.
- C. Remove and replace railings where test results indicate that they do not comply with specified requirements unless they can be repaired in a manner satisfactory to Architect and comply with specified requirements.
- D. Perform additional testing and inspecting, at Contractor's expense, to determine compliance of replaced or additional work with specified requirements.

3.5 CLEANING

- A. Clean by washing thoroughly with clean water and soap, rinsing with clean water, and wiping dry.
- B. Clean wood rails by wiping with a damp cloth and then wiping dry.
- C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

3.6 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

- B. Restore finishes damaged during installation and construction period, so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 057300

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SECTION 061200 - STRUCTURAL INSULATED PANELS (SIP'S)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related Requirements:
 - 1. Section 017419 - Construction and Demolition Waste Management and Disposal
 - 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
 - 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
 - 4. Section 051200 "Structural Steel Framing" for steel frame.
 - 5. Section 061000 "Rough Carpentry" for miscellaneous wood framing, blocking and nailers, not part of the SIPs assembly.
 - 6. Section 061800 "Glue-Laminated Construction" for timber frame.
 - 7. Section 072100 "Thermal Insulation" for insulation products not part of the SIPs assembly.

1.2 SUMMARY

- A. Sustainable Design Requirements: The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.
- B. This Section includes fabrication and/or installation of the following:
 - 1. Structural Insulated Panel (SIP) Roof Panels
 - 2. Structural Insulated Panel (SIP) Wall Panels
 - 3. Field installed spline materials at SIP joints, such as oriented strand board (OSB), plywood, dimension lumber or engineered wood products.
 - 4. Adhesives
 - 5. Fasteners such as nails, spikes, and screws with or without metal stress plates/washers.
 - 6. Opening let-ins (window, door, etc) for factory or field installed wood bucks, nailers, and blocking.

7. Site applied expanding foam for joint or void sealing.
9. Solid Sawn and Engineered Lumber materials for spacers, shims, top and bottom plates, beveled/angled plates.
10. Wire chases (wire chases and sleeves where required)
11. Headers - lumber or SIP
13. Accessory or miscellaneous materials.
14. On-site services

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 STRUCTURAL LOAD AND CODE PERFORMANCE REQUIREMENTS

- A. All panels are to comply with applicable codes. Structural Insulated Panels are to be fabricated to withstand specified loads without exceeding allowable tested or calculated design working stress of the materials involved and in order to meet or exceed applicable building code requirements and ASCE 7.
- B. Structural loads and design criteria to be included in design and as indicated on structural drawings.

1.5 DEFINITIONS

- A. Structural insulated panels (SIP's) include prefabricated building components or cladding as sandwich panels or other integrated assemblies constructed of oriented strand board (OSB) or plywood interior and exterior skins of same thickness and composition bonded to each face of a Modified Expanded Polystyrene (MEPS) foam core. Finish materials may be factory or field applied to interior of SIP's. Panels shall be limited to buildings where combustible construction is permitted by applicable model code organization and acceptable to authorities having jurisdiction so adopting such code.

1.6 SUBMITTALS - General

- A. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- B. Submit the following evidence to confirm compliance with this section in accordance with Conditions of Contract and Division 1 Specification Sections.
1. Manufacturer's Installation Guide
 2. Manufacturer's Product Data
 3. SIP Evaluation Report from an ISO 17065:2012 accredited agency with engineering properties.
 4. Structural calculations including allowable load tables; (further substantiating 1.5.11 above); roof diaphragms, shear walls, attachments and connections between panels have been designed to resist design loads indicated on the structural drawings. Calculations shall be signed and sealed by a professional engineer registered to practice in the State of Connecticut.
 5. Product data for SIP material components (skins and core), splines, adhesive, fasteners, sealant, finishes, lumber, and other miscellaneous materials with their own third party test reference where applicable.
 6. Manufacturer's typical and standard construction details for various intersections and junctions of wall, floor, ceiling, roof, foundation panels and supporting structural members.
 7. Manufacturer's warranty standard document with regards to coverage term and limitations in reference to de-lamination, or failure as result of materials or workmanship defects. Submit for building owner acceptance and execution.
 8. Samples (at least two) of following for verification purposes:
 - a. approximately 12 inch square of fabricated panel in each thickness applicable to building
 - b. same as above including shop applied interior finish materials
 - c. fasteners (nails or screws with metal washer/plate) for attachment of SIP's to supporting structure or building elements
 - d. spline materials (lumber, engineered wood, or sheathing types)
 - e. example of panel joint with spline materials
 - f. mastic gun tube of seam air sealant
 - g. can of expanding foam sealant
 - h. tube of air sealant mastic
 - i. Shop Drawings drawn to scale, indicating applicable building code and structural design criteria as stated on architect or engineer's construction documents which shall generally include:
 - 1) Panel shapes, dimensions, and thicknesses; spline and/or joint materials; typical and standard construction sections and details and for those specifically required for the building; foam relief details or gap, seam or

sealant locations and procedures; fastener types, lengths, spacings and patterns; standard and/or special wire chases; interior finish materials; indication of materials and/or work by panel manufacturer or by others (stating by whom); roof pitches or slopes; angle or plumb cuts for top plates, eaves, rakes or for supporting members at bearing details; horizontal and/or sloped spans; cross sections, elevations, or profiles of building areas; overall or key plan showing erected/installed/in place assembly of wall, floor, ceiling, roof, or foundation SIP's with panel identification designations (tags); direction of tongue and groove orientation; interior factory-applied finishes; and other information as required to clearly show installed system compatible with building design.

- 2) Provide shop drawings that have been prepared, supervised, sealed or stamped, signed, and dated by legally professional structural engineer (P.E.) per the licensure requirements of the state where the building is located, following the review and approval shop drawing process by the building professional and SIP manufacturer.

1.7 QUALITY ASSURANCE

- A. Architect or Engineer Qualifications: a professional currently and legally authorized to practice in jurisdiction where project is located and experienced in providing architectural or engineering services of the kind indicated that have resulted in the installation of SIP's similar to those of this project and with a record of successful in-service performance.
- B. Fabricator's/Manufacturer's Qualifications: a Manufacturer that complies with a quality assurance program approved by a Building Code Product/Listing agency and inspected by a third party/independent agency recognized by the building authorities having jurisdiction. Fabricators shall have a minimum of four years of continued SIP production experience and shall fabricate the panels in accordance with the Manufacturer's National Evaluation Report.
 1. SIP Manufacturer shall be a manufacturing member of the Structural Insulated Panel Association (SIPA).
 2. The SIP manufacturing and quality assurance systems must be reviewed and approved by an ISO 17020:2012 accredited agency annually.
 3. The SIP manufacturing and quality assurance systems must be audited by an ISO 17020:2012 accredited agency, at least quarterly.
 4. The SIP properties must be verified by an ISO 17025:2012 accredited test lab, at least quarterly.
 5. Each SIP delivered must display the name or logo of the appropriate ISO 17065:2012 accredited certification agency and appropriate code listing number.
- E. Installer Qualifications: Installer shall have similar, specialized qualifications and experience as to that of a Fabricator, as herein specified, for work similar to that required

for this project. Panels to be installed per approved shop drawings and Fabricator's details, installation manual/guide, and NER. Installer shall have a minimum of four years of continued SIP installation experience and shall install the panels in accordance with the manufacturer's NER. Contractor shall choose one of the following options for installation of the SIPS panels.

1. Contractor to arrange for SIP installation specified in this section by the Fabricator or the Fabricator's approved Installer.
 2. Installation is by the contractor or a subcontractor to the contractor. Fabricator to provide panel advisor for the required period of time during complete SIP installation phase, to apprise the contractor's crew of the proper methods, techniques, and sequences needed for a proper panel installation.
- F. Pre-installation Conference/Meeting: Fabricator to provide representative (sales representative or panel advisor) to attend meeting to verify project requirements, substrate conditions in which panels are to be installed, review manufacturer's approved shop drawings, installation manual/guide, warranty and similar requirements. Frequency, duration and time schedule to be determined prior to start of construction.

1.8 DELIVERY, STORAGE AND HANDLING

- A. All panels shall be stored in a weather protected area, elevated and set level and properly supported on platform or pallets to prevent deflection or deforming. Panels shall be isolated from contact with the ground or water. Panels shall not be exposed to excessive humidity for extended periods of time. Follow OSB manufacturers recommendations regarding water, moisture and humidity exposure. Provide for air circulation within and around stacks of panels.
- B. Until day of installation, panels shall be temporarily protected with tarps from exposure to direct sunlight and/or moisture to prevent accumulation of moisture exceeding 15% content. Panels with moisture content greater than 15% will be rejected and not allowed to be installed.
- C. Adhesives, sealants, foams and similar materials shall be stored, handled, and used per manufacturer's directions and requirements.
- D. Time delivery and erection of panels to avoid extended on-site storage and to avoid delaying work of other trades whose work must follow panel erection.
- E. If T & G is being provided by panel fabricator, loose and not factory installed to panel, such shall be stored in the same manner as the panels until ready to be installed.

1.9 WARRANTY

- A. Provide 20-Year product warranty against delamination as a result of a defect in materials or manufacturing from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2–PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 AVAILABLE MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide SIPs panels and accessories as manufactured by FOARD Panel, 53 Stow Drive; West Chesterfield, New Hampshire, 03466; or a comparable product by one of the following:
 - a. Extreme Panel Technologies, 475 East 4th Street North, P.O. Box 435, Cottonwood, MN 56229
 - c. Insulspan / GLI, 9012 East US 223, P.O. Box 38, Blissfield, Michigan 49228

2.3 MATERIALS

- A. Structural insulated panels, a pressure laminated sandwich panel, consisting of the following:
 - 1. Foam core, EPS, Type I, nominal 1.0 pcf density, complying with ASTM C 578-87A, made under supervision of third-party NES listed Quality Assurance agency.
 - 2. OSB interior and exterior skin, 5/8-inch thickness, APA or TECO tested sheathing, exposure 1 durability rating, conforming to US DOC PS-2 standard, one piece for full length of the panel (no joints in skins).
 - 3. Adhesives, qualified and used to laminate OSB skins to the foam core, covered by an NER report for sandwich panel applications and designated in the panel manufacturer's Quality Control Manual., Adhesive shall have an in-use temperature range of -40 to +180 degrees F.
 - 4. Splines, for use in joining panels, shall be supplied by panel fabricator. Depth of splines shall be 1/8 inch less than EPS core thickness to allow for field-applied adhesive and/or foam sealer at joints and to allow efficient assembly.
 - a. OSB or plywood, 5/8-inch-thick, 3-inch-wide, of same material properties as 2.2A.2 above, used when there is no structural capacity assembly requirement.
 - b. Dimensional lumber, manufacturer's standard SPF #2, southern yellow pine or Douglas Fir species, nominal 2 inch and actual 1 1/2-inch width or 3-inch

(76.2 mm) and actual 2 ½ inch for single spline and nominal 4-inch (101.6 mm) and actual 3-inch width for double splines.

- B. Adhesive, construction type, caulk gun tube form, water based, for field application between splines plates or other lumber at panel edges or joints, meet ASTM C-557 and D-3498, AFG-01, and FHA UM-60 standards, compatible with adjacent materials, as manufactured by Hilti Construction Chemicals, Inc., CA-3600 or approved equal by panel manufacturer.
- C. Fastener specifications spacings, and type shall be determined by the panel manufacturer and based on structural loads and code design performance criteria.
 - 1. Nails, meeting Federal Specification FF-N-105B, Fyb minimum of 100,000 psi (690 MPa) for 6d and 8d common nails; Fyb minimum of 90,000, psi for 10d common nails, for attaching OSB skins to lumber splines or attaching OSB skins and OSB or plywood splines. Spikes shall be used for attaching panels to wood structural supporting members. Such shall penetrate into wood 1 1/2-inch minimum with 2 inches recommended and depending on wood species and fastener standard length less panel thickness. Spikes shall be ringshank, hot dip galvanized as manufactured by W.H. Maze Co. 'Skinny Spikes', 'Gutter Spikes' or 'Stormguard Spikes' or approved equal by panel fabricator.
 - 2. Staples, 16 gauge minimum, 7/16-inch (11.1 mm) crown by 1 3/4-inch length, at 6 inches on center, may be used in lieu of nails to fasten skins to splines or lumber. Load tables must be referenced to select values for staples in lieu of nails. Manufacturer as approved by panel fabricator.
 - 3. Screws, no. 6 drywall type, 1,25 inch (31.8 mm) minimum length, for fastening panel skins to OSB or plywood/surface splines. USG or manufacturer as approved by panel Fabricator.
 - 4. Panel screws shall be used for attaching panels to wood structural supporting members or nailers. Such shall penetrate into wood 1 1/2-inch minimum with 2 inches (50.8 mm) recommended. Internal square drive in pancake head, 3/16-inch (4.8 mm) shank diameter, 1/4-inch thread diameter, spade point, heat treated and coated steel, Olympic Manufacturing Group 'Panel Fastener' or Trufast Corporation 'Timberfast' or as approved by panel Fabricator.
 - 5. Metal stress plates (also called washers) are to be used with panel screws to help reduce or prevent fastener head from going into or through OSB skin. 26 gauge galvanized plated metal, 2-inch diameter, and meeting FM I-60 or I-90 wind uplift requirements. Plates as manufactured by Trufast Corporation or as approved by panel Fabricator.
 - 6. Windows, doors, or similar opening wood bucks, nailers, and blocking, shall be dimensional or engineered lumber per 2.2.1.2 above. Lumber for openings to be supplied loose and installed by panel fabricator in field cut rough openings.
- E. Foam relief for lumber let-ins at openings, rake, eave and other similar edge conditions, to be factory installed.
- F. Manufacturer's recommended panel sealing method using mastic or foam.

- G. Expanding foam, to act as caulk sealant and adhesive, for joint foam gap, or void filling for factory or field installing, two part quick cure, slow rise poured-in-place, chemical cure polyurethane foam as manufactured by FOMO Products, Inc. 'Handi-foam' SR with backpack hoses and gun, model 11-100 or approved equal by panel fabricator. Moisture cure polyurethane form in spray can for small applications, meets DOT-E 10131 M4106 and CCMA #09421-R as manufactured by FOMO Products, Inc. 'Handi-foam'.
- H. Lumber materials for shims and spacers for later application of interior finish materials shall be OSB or plywood per 2.2.0.2 requirements. Top and bottom, beveled, angled, built-up plates or similar lumber shall be dimensional lumber per 2.2.1.2 requirements. Multiple or built-up lumber plates to be adhesive and fastened to each other and to supporting structural members per panel fabricator's requirements.
- I. Wire Chases:
 - 1. Horizontal Wire chases in walls for electrical wiring shall not be allowed, except where noted.
 - 2. Vertical wire chases in wall panels shall not be allowed, except where noted. Standard or special wire chases shall be 1 1/2-inch square and at center of EPS core of panel. Wire chases are in straight line and parallel to rectangular edges of panel. Wire chase can not be run at angle, curved, or in multiple directions.
 - 3. Provide sleeves where indicated, or where required for exterior mounted fixtures and equipment. Sleeves shall be of the same material as conduit specified for the building and shall be installed in the field. Sleeves are installed to prevent being closed off by foam insulation.
- J. Headers for openings shall be dimensional or engineered lumber per 2.2.1.2 and 2.2.1.3 requirements or SIP type as determined by panel fabricator and designed for the applied loads.

2.4 PANEL PERFORMANCE CHARACTERISTICS

- A. Size of panel shall be a maximum of 8 feet in width and length as indicated. Sizes and shapes shall be as required per construction documents and per panel fabricator's approved shop drawings.
- B. Panel type, thickness, weight, thermal (R and U-value), and Perm rating
 - 1. Structural Insulated Panel (SIP) Roof: R-50
 - 2. Structural Insulated Panel (SIP) Walls: R-35
 - 4. Dimensional tolerance(s) for panel fabrication and installation shall comply with values listed in NER & Manufacturer's quality control manual.
 - 5. Structural and fire performance tests shall be per those stated in sections 1.3 Structural Code and Load Requirements and 1.5 Submittals,
 - 6. Finishes: Field Installed

- C. Permeability Ratings:
 - 1. Walls: 0.35 perm
 - 2. Roof: 0.29 perm

PART 3 - INSTALLATION

3.1 GENERAL

- A. The contractor shall examine and inspect levelness, plumb, and squareness conditions of structural framing members, plates, nailers, walls, floors, foundations and other substrates to which panels are to be applied. Contractor shall be responsible for evaluating site, weather, alignment, field measurements, and other conditions, which may affect the proper and suitable installation of panels. Any adverse conditions are to be corrected by others prior to commencing with installation.
- B. Erection and installation of system shall be in strict accordance with fabricator's product data, published installation manual/guide, NER, approved shop drawings, details, calculations, and contract documents. Any conflicts between contract documents and panel fabricator's documents shall be resolved in writing.
- C. After review and approval of calculations and shop drawings by project design professional, panel fabricator shall submit three sets of same bearing architect or professional engineer's stamp or embossed seal, signature, and date for submittal to governing regulatory agency for their plan review and permit issuance purposes. Deviations from structural load or code design performance criteria and/or construction documents and/or panel fabricator's standard details and Quality Assurance (QA) requirements, shall be calculated and sealed/signed/dated by the project design professional.
- D. On-site services shall be provided by panel fabricator as indicated in 1.6 Quality Assurance, herein this section, and in construction documents. Coordinate frequency, duration, and schedule required with panel installers or others.

3.2 PROTECTION

- A. Time delivery and erection of panels to avoid extended on-site storage and to avoid delaying work of other trades whose work must follow panel erection.
- B. Coordinate sequence and scheduling with electrician and verify if electrical wiring or sleeves to be installed before or during panel installation or if joints adjacent to wire chases to be foam sealed.
- C. Handle and install panels in a manner to prevent denting, damage to edges, surfaces, factory-installed finish materials, and so will allow proper installation of later or field installed finish materials. Prevent bending, warping, twisting and surface damage.
- D. Following panel installation, during the same day and prior to threats of rain, snow or other weather conditions that would wet the OSB:
- E. Install seam sealant at roof panel joints

- F. Install weather sealant;
- G. Foam sealant at joints, junctures, foam gaps, wire chases, and other voids;
- H. Install approved weather barrier/ air infiltration wrap/felts at walls; over or underlayment/felts at roofs to prevent contact with water, snow, or ice or other detrimental and incompatible materials or environmental conditions
- J. Interior finishes or overlayments field installed by others (not panel fabricator or installer) following panel installation, must have a minimum of temporary weather barrier at time of installation and until final and permanent roofing and siding/cladding materials can be installed.

3.3 PREPARATION

- A. Provide level, square, and continuous bearing or support under OSB skins, faces or edges. Plates, nailers and other supports to be properly and suitable fastened or anchored for lateral or uplift loads. Provide temporary and/or permanent posts, columns, bracing, walls, or other supports ready to attach and support panels.
- B. Provide 1 1/2-inch diameter access holes in any non-structural plates, splines, or similar members to align with electrical wire chase (horizontal or vertical/special). Sleeves may be required if wires installed/pulled after foaming of panel joints.

3.4 INSTALLATION

- A. Anchor panels to plates, walls, nailers, structural or other supporting members with staples, nails, spikes, or screw fasteners at spacings and patterns shown on and per approved shop drawings meeting requirements of Section 1.3.
- B. Foam all joints, gaps, plates, or other voids for airtight and weather resistant seal and to prevent air infiltration.
- C. Where panels do not fit, field modify to fit or if necessary, replace with new panel of proper and correct size as so determined by panel Fabricator.
- D. Field cutting and foam edge relieving of panels may be required at openings or as shown on shop drawings. Contractor shall coordinate this work with panel fabricator, installer and all trades.
- E. Remove and replace panels which have become excessively or repeatedly wet or otherwise damaged before proceeding with installation of additional panels or any other work or deteriorated beyond successful repair by finish touch-up or similar minor repair procedures.
- F. Restrictions:
 - 1. Do not install panels such that OSB skins or let-in plates are to come in contact with masonry, concrete, ground, or other similar detrimental materials. Proper isolation or moisture treated materials required.

2. Do not field cut plumbing, mechanical or other chases in panel core or skins without consulting panel fabricator and receiving written approval to do such. Do not overcut skins for field-cut openings. Provide proper air clearance/separation/isolation between masonry and wood materials of panels per model building codes.
3. Do not cut structural splines or other supporting members within panels.
4. Contractor to provide proper and continuous humidity and ventilation systems within building to control interior humidity, assure air quality and prevent damage to panels from excess humidity.
5. Contractor to provide thermal or weather barriers and vapor retarders per fire and model building code requirements or applied finish materials per manufacturer's requirements.
6. Contractor to provide control joints which should be incorporated into the finishing of the sheet or board finish goods according to the applicable finish manufacturer's recommendations and/or industry standards by whomever is contracted to perform the finishing work on site on these materials.

3.5 CLEANING

- A. Remove temporary barriers or coverings and protection of adjacent work areas. Remove excess adhesive or foam sealant so it is flush with panel skins. Clean stain, scuff, traffic or installation/erection marks or blemishes from finish materials and/or interior finishes as a result of panel installation. Remove construction debris, related to panel installation, to on-site or off-site disposal locations.

3.6 WARRANTY

- A. Execute manufacturer's standard warranty form as specified.

END OF SECTION 061200

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SECTION 061533 - WOOD DECKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Wood decking. Wood lumber decking to be furnished by Owner, FOB Job site. Lumber to be off-loaded, handled, cut, finished and installed by Contractor.

B. Related Requirements:

1. Section 017419 - Construction and Demolition Waste Management and Disposal
2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
4. Section 061800 "Glue-Laminated Construction" for wood bridge framing.
5. Section 099300 "Staining and Transparent Finishing" for finish on wood decking.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 DEFINITIONS

- A. Boards: Lumber of less than 2 inches nominal in thickness and 2 inches nominal or greater in width.

- B. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
- C. Timber: Lumber of 5 inches nominal or greater in least dimension.

1.5 ACTION SUBMITTALS

- A. Product Data: For metal framing anchors.
 - 1. For metal framing anchors. Include installation instructions.
- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
 - 2. Regional Materials: Owner will provide lumber which has been milled within 100 miles of Project site from materials that have been extracted, harvested, or recovered, within 100 miles of Project site.

1.6 INFORMATIONAL SUBMITTALS

- A. Affidavit of Receipt of Lumber: Contractor shall provide letter on company letterhead confirming receipt of lumber in quantities required to complete the Work of this Contract, the extents indicated.
- B. Evaluation Reports: For the following, from ICC-ES:
 - 1. Decking fasteners.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials under cover and protected from weather and contact with damp or wet surfaces. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2–PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 LUMBER, GENERAL

- A. Maximum Moisture Content:
 - 1. Dimension Lumber: 15 percent.

2.3 WOOD DECKING

- A. Hand select wood for freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot holes, shake, splits, torn grain, and wane.
- B. Dimension Lumber Decking to be 3 x 6, Red or White Oak, as furnished by the Owner.

2.4 WOOD RAILINGS

- A. Hand select wood for freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot holes, shake, splits, torn grain, and wane.
- B. Dimension Lumber for wood railings to be 2 x 6, Red or White Oak, as furnished by the Owner.

2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated, acceptable to authorities having jurisdiction, and that comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than 1-1/2 inches into wood substrate.
 - 1. Use fasteners with hot-dip zinc coating complying with ASTM A153/A153M or ASTM F2329 unless otherwise indicated.
- B. Nails: ASTM F1667.
- C. Power-Driven Fasteners: ICC-ES AC70.
- D. Wood Screws and Lag Screws: ASME B18.2.1, ASME B18.6.1, or ICC-ES AC233.
- E. Carbon-Steel Bolts: ASTM A307 with ASTM A563 hex nuts and, where indicated, flat washers all hot-dip zinc coated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Stain wood, including both faces and edges. Cut to required lengths and stain ends. Comply with requirements in Section 099300 "Staining and Transparent Finishing."

3.3 INSTALLATION, GENERAL

- A. Set work to required levels and lines, with members plumb, true to line, cut, and fitted. Fit work to other construction; scribe and cope as needed for accurate fit.
- B. Framing Standard: Comply with AF&PA WCD1 unless otherwise indicated.
- C. Install wood decking with crown up (bark side down).
- D. Secure decking to framing with screws.
- E. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of members or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- F. Securely attach exterior rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Refer to Structural Drawings for fastening requirements. .
- G. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced and with adjacent rows staggered.

3.4 INSTALLATION OF RAILINGS

- A. Balusters: Fit to railings, bolt in place, as indicated.

END OF SECTION 061533

SECTION 061800 - GLUED-LAMINATED CONSTRUCTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related work specified elsewhere
 - 1. Section 017419 - Construction and Demolition Waste Management and Disposal.
 - 2. Section 018113 - Sustainable Design Requirements.
 - 3. Section 018119 - Construction Indoor Air Quality Requirements.

1.2 SUMMARY:

- A. Section includes framing using structural glued-laminated timber.
- B. Related Requirements:
 - 1. Section 061000 "Rough Carpentry" for dimension lumber items associated with structural glued-laminated timber.
- C. Sustainable Design Requirements: The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.
- D. Related work specified elsewhere.

1.3 DEFINITIONS:

- A. Structural Glued-Laminated (Glulam) Timber: An engineered, stress-rated timber product assembled from selected and prepared wood laminations bonded together with adhesives and with the grain of the laminations approximately parallel longitudinally.

1.4 SUBMITTALS:

- A. Product Data: For each type of product.

1. Include data on lumber, adhesives, fabrication, and protection.
 2. For preservative-treated wood products. Include chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
 3. For connectors. Include installation instructions.
- B. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Shop Drawings:
1. Show layout of structural glued-laminated timber system and full dimensions of each member.
 2. Indicate species and laminating combination.
 3. Include large-scale details of connections.
 4. Engineered Shop Drawings: For Structural Glued-Laminated Timber and timber connectors, include detailed analysis data to verify compliance with requirements.
- D. Samples: Full width and depth, 24 inches long, showing the range of variation to be expected in appearance of structural glued-laminated timber including variations due to specified treatment.
1. Apply specified factory finish to three sides of half length of each Sample.
- E. Certificates of Conformance: Issued by a qualified testing and inspecting agency indicating that structural glued-laminated timber complies with requirements in AITC A190.1.
- F. Material Certificates: For preservative-treated wood products, from manufacturer. Indicate type of preservative used and net amount of preservative retained.
- G. Research/Evaluation Reports: For structural glued-laminated timber and timber connectors, from ICC-ES.
- 1.5 QUALITY ASSURANCE:
- A. Manufacturer Qualifications: An AITC- or APA-EWS-licensed firm certified for chain of custody by an FSC-accredited certification body.
- 1.6 DELIVERY, STORAGE, AND HANDLING:
- A. General: Comply with provisions in AITC 111.

- B. Individually wrap members using plastic-coated paper covering with water-resistant seams.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. Manufacturers: Subject to compliance with requirements
 1. Unilam
 2. Boise Cascade
 3. Weyerhaeuser
- B. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 PERFORMANCE REQUIREMENTS:

- A. Structural Performance: Structural glued-laminated timber and connectors shall withstand the effects of structural loads shown on Drawings without exceeding allowable design working stresses listed in AITC 117 or determined according to ASTM D 3737 and acceptable to engineer of record.
- B. Seismic Performance: Structural glued-laminated timber and connectors shall withstand the effects of earthquake motions determined according to ASCE 7.

2.3 STRUCTURAL GLUED-LAMINATED TIMBER:

- A. General: Provide structural glued-laminated timber that complies with AITC A190.1 and AITC 117 or research/evaluation reports acceptable to authorities having jurisdiction.
 1. Factory mark each piece of structural glued-laminated timber with AITC Quality Mark or APA-EWS trademark. Place mark on surfaces that are not exposed in the completed Work.
 2. Provide structural glued-laminated timber made from single species.
 3. Provide structural glued-laminated timber made from solid lumber laminations; do not use laminated veneer lumber.
 4. Provide structural glued-laminated timber made with wet-use adhesive complying with AITC A190.1.
 5. Adhesive shall not contain urea-formaldehyde resins.

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- 6. Adhesives shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services) "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

 - B. Regional Materials: Glued-laminated timber shall be manufactured within 500 miles of Project site from wood that has been harvested and milled within 500 miles of Project site.

 - C. Certified Wood: Glued-laminated timber shall be certified as "FSC Pure" according to FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship," and to FSC STD-40-004, "FSC Standard for Chain of Custody Certification."

 - D. Species and Grades for Structural Glued-Laminated Timber: As indicated on drawings shall comply with "Performance Requirements" Article.

 - E. Species and Grades for Structural Glued-Laminated Timber: Southern Yellow Pine (SYP) .

 - F. Appearance Grade: Architectural, complying with AITC 110.
 - 1. For Premium and Architectural appearance grades, fill voids as required by AITC 110. For Premium appearance grade, use clear wood inserts, of matching grain and color, for filling voids and knot holes more than 1/4 inch wide.

2.4 PRESERVATIVE TREATMENT:

- A. Preservative Treatment: Where preservative-treated structural glued-laminated timber is indicated, comply with AWWA U1.
 - 1. Use preservative solution without water repellents or substances that might interfere with application of indicated finishes.
 - 2. Do not incise structural glued-laminated timber or wood used to produce structural glued-laminated timber.

- B. Preservative:
 - 1. Oxine copper (copper-8-quinolinolate) in a light petroleum solvent.
 - 2. Pentachlorophenol in light petroleum solvent.
 - 3. Copper naphthenate in a light petroleum solvent.
 - 4. Ammoniacal zinc copper arsenate (ACZA) in a water solution.
 - 5. Chromated copper arsenate (CCA) in a water solution.
 - 6. Ammoniacal copper quat Type A (ACQ-C) in a water solution.
 - 7. Propiconazole tebuconazole imidacloprid (PTI) in a water emulsion.

- C. After dressing members, apply a copper naphthenate field-treatment preservative to comply with AWWA M4 to surfaces cut to a depth of more than 1/16 inch.

2.5 TIMBER CONNECTORS:

- A. General: Unless otherwise indicated, fabricate from the following materials.
- B. Fabricate beam seats from steel with 3/8-inch bearing plates, 3/4-inch- diameter-by-12-inch-long deformed bar anchors, and 0.239-inch side plates.
- C. Fabricate beam hangers from steel with 0.179-inch stirrups and 0.239-inch top plates.
- D. Fabricate strap ties from steel.
- E. Provide bolts, 3/4 inch unless otherwise indicated, complying with ASTM A 307, Grade A; nuts complying with ASTM A 563; and, where indicated, flat washers.
- F. Provide shear plates complying with ASTM D 5933.
- G. Materials: Unless otherwise indicated, fabricate from the following materials:
 - 1. Structural-steel shapes, plates, and flat bars complying with ASTM A 36/A 36M.
 - 2. Round steel bars complying with ASTM A 575, Grade M 1020.
 - 3. Hot-rolled steel sheet complying with ASTM A 1011/A 1011M, Structural Steel, Type SS, Grade 33.
- H. Finish steel assemblies and fasteners with rust-inhibitive primer, 2-mil dry film thickness.
 - 1. Primer shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- I. Hot-dip galvanize steel assemblies and fasteners after fabrication to comply with ASTM A 123 or ASTM A 15.

2.6 MISCELLANEOUS MATERIALS:

- A. End Sealer: Manufacturer's standard, transparent, colorless wood sealer that is effective in retarding the transmission of moisture at cross-grain cuts and is compatible with indicated finish.
- B. Penetrating Sealer: Manufacturer's standard, transparent, penetrating wood sealer that is compatible with indicated finish.
- C. Sealers shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for

the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.7 FABRICATION:

- A. Shop fabricate for connections to greatest extent possible, including cutting to length and drilling bolt holes.
 - 1. Dress exposed surfaces as needed to remove planing and surfacing marks.
- B. Camber: Fabricate horizontal and inclined members of less than 1:1 slope with either circular or parabolic camber equal to 1/500 of span.
- C. Where preservative-treated members are indicated, fabricate (cut, drill, surface, and sand) before treatment to greatest extent possible. Where fabrication must be done after treatment, apply a field-treatment preservative to comply with AWWA M4.
 - 1. Use inorganic boron (SBX) treatment for members not in contact with the ground and continuously protected from liquid water.
 - 2. Use copper naphthenate treatment for members in contact with the ground or not continuously protected from liquid water.
- D. End-Cut Sealing: Immediately after end cutting each member to final length and after preservative treatment, apply a saturation coat of end sealer to ends and other cross-cut surfaces, keeping surfaces flood coated for not less than 10 minutes.
- E. Seal Coat: After fabricating, sanding, and end-coat sealing, apply a heavy saturation coat of penetrating sealer on surfaces of each unit.

2.8 FACTORY FINISHING:

- A. Wiped Stain Finish: Manufacturer's standard, dry-appearance, penetrating acrylic stain and sealer; oven dried and resistant to mildew and fungus.
 - 1. Color: Natural.
- B. Clear Finish: Manufacturer's standard, two-coat, clear varnish finish; resistant to mildew and fungus.
- C. Finishing materials shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 EXAMINATION:

- A. Examine substrates in areas to receive structural glued-laminated timber, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION:

- A. General: Erect structural glued-laminated timber true and plumb and with uniform, close-fitting joints. Provide temporary bracing to maintain lines and levels until permanent supporting members are in place.
 - 1. Handle and temporarily support glued-laminated timber to prevent surface damage, compression, and other effects that might interfere with indicated finish.
- B. Framing Built into Masonry: Provide 1/2-inch clearance at tops, sides, and ends of members built into masonry; bevel cut ends 3 inches ; and do not embed more than 4 inches unless otherwise indicated.
- C. Cutting: Avoid extra cutting after fabrication. Where field fitting is unavoidable, comply with requirements for shop fabrication.
- D. Fit structural glued-laminated timber by cutting and restoring exposed surfaces to match specified surfacing and finishing.
 - 1. Predrill for fasteners using timber connectors as templates.
 - 2. Finish exposed surfaces to remove planing or surfacing marks and to provide a finish equivalent to that produced by machine sanding with No. 120 grit sandpaper.
 - 3. Coat cross cuts with end sealer.
 - 4. Where preservative-treated members must be cut during erection, apply a field-treatment preservative to comply with AWWA M4.
 - a. Use inorganic boron (SBX) treatment for members not in contact with the ground and continuously protected from liquid water.
 - b. Use copper naphthenate treatment for members in contact with the ground or not continuously protected from liquid water.
- E. Install timber connectors as indicated.

1. Unless otherwise indicated, install bolts with same orientation within each connection and in similar connections.
2. Install bolts with orientation as indicated or, if not indicated, as directed by Engineer of Record.

3.3 ADJUSTING:

- A. Repair damaged surfaces and finishes after completing erection. Replace damaged structural glued-laminated timber if repairs are not approved by Architect.

3.4 PROTECTION:

- A. Do not remove wrappings on individually wrapped members until they no longer serve a useful purpose, including protection from weather, sunlight, soiling, and damage from work of other trades.
 1. Coordinate wrapping removal with finishing work. Retain wrapping where it can serve as a painting shield.
 2. Slit underside of wrapping to prevent accumulation of moisture inside the wrapping.

END OF SECTION 061800

SECTION 064023 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Interior standing and running trim.
2. Interior board paneling
3. Wood furring, blocking, shims, and hanging strips for installing interior architectural woodwork items that are not concealed within other construction.
4. Shop priming of interior architectural woodwork.
5. Shop finishing of interior architectural woodwork.

- B. Related Requirements:

1. Section 017419 - Construction and Demolition Waste Management and Disposal
2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
4. Section 061053 "Miscellaneous Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing interior architectural woodwork that are concealed within other construction before interior architectural woodwork installation.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections, to ensure that interior architectural woodwork can be supported and installed as indicated.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

- A. Product Data: For the following:

- 1. Anchors.
- 2. Adhesives.
- 3. Shop finishing materials.

- B. Sustainable Design Submittals:

- 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- 2. Chain of Custody: Provide affidavit confirming wood products sourced through CT Department of Energy and Environmental Protection's Portland, CT Mill have been received and are the products used for this project.
- 3. Regional Materials: Owner will provide lumber which has been milled within 100 miles of Project site from materials that have been extracted, harvested, or recovered, within 100 miles of Project site.

- C. Shop Drawings:

- 1. Include the following:
 - a. Dimensioned plans, elevations, and sections.
 - b. Attachment details.
- 2. Show large-scale details.
- 3. Show locations and sizes of furring, blocking, and hanging strips, including blocking and reinforcement concealed by construction and specified in other Sections.

- D. Samples: For each exposed product and for each shop-applied color and finish specified.

- 1. Size:

- a. Lumber Products: Not less than full board width furnished by Owner by 24 inches long, for each species and cut, finished on one side and one edge.

E. Samples for Verification: For the following:

- 1. Boards for Transparent Finish: Not less than width of board furnished by Owner by 24 inches long, for each species and cut, finished on one side and one edge.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: For the following:
 - 1. Adhesives.
- C. Field quality-control reports.

1.8 QUALITY ASSURANCE

- A. Qualifications: Employs skilled workers who custom fabricate and install products similar to those required for this Project and whose products have a record of successful in-service performance.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Build mockups of each type of woodwork, including the following:
 - a. Wainscot, including chair rail and base.
 - b. Wall paneling, including top rail and base
 - c. Running trim, including base and door and window trim
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Owner specifically approves such deviations by Change Order.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Owner will furnish boards FOB job site. Contractor shall off-load and take possession of boards for use. Contractor shall be responsible for cutting to fit, finishing and installing all woodwork.
- B. Do not deliver interior architectural woodwork until painting and similar finish operations that might damage woodwork have been completed in installation areas.

- C. Store woodworking in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior architectural woodwork until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of the construction period.
- B. Environmental Limitations: Do not deliver or install interior architectural woodwork until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 43 and 70 percent during the remainder of the construction period.
- C. Field Measurements: Where interior architectural woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings.
 - 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being concealed by construction, and indicate measurements on Shop Drawings.
- D. Established Dimensions: Where interior architectural woodwork is indicated to fit to other construction, establish dimensions for areas where woodwork is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.11 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 ARCHITECTURAL WOODWORK MANUFACTURERS

- A. Finish Boards for Paneling and Running and Standing Trim:

1. Source Limitations: Wood Boards shall be furnished by CT DEEP, Portland Mill, in quantities sufficient of the indicated Work. Contractor shall unload boards at project site and take possession of material for use as paneling and running and standing trim. Boards shall be furnished as follows:
 - a. All areas scheduled to have wood base shall be 1 x 6. Species shall be same as adjacent paneling. Where not adjacent to paneling, species shall be Red or White Oak. Chair rails and top of paneling trim shall match wainscot and wall paneling.
 - b. Wainscot and paneling at Vestibule 101 shall be Oak
 - c. Wainscot at Corridor 102 shall be Oak
 - d. Paneling at Locker Area 110 shall be Oak
 - e. Wainscot and Paneling at Corridor 117 shall be Oak
 - f. High Base at Vestibule 201 is Maple
 - g. Wainscot and Paneling at Lobby 202 is Maple
 - h. Paneling, Wainscot and Trim at Training Room 204 is Cherry
 - i. Wainscot at Conference 205 shall be Ash
 - j. Wainscot and Paneling at Corridor 206 is Maple
 - k. Paneling and Wainscot at Reception 212 is Maple
 - l. Wall paneling at Open Office 213 shall be Maple
 - m. Paneling and Wainscot at Breakroom 221 and kitchenette 222 is Maple
2. Wood Moisture Content: When delivered to site shall be 8 to 13 percent.
3. Boards used for paneling shall be random width 1 x 6 minimum to 1 x 10 maximum, tongue & groove, with V-groove.
4. Chair rails shall be delivered with detailed profile and delivered in long lengths.

2.3 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Nailers: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content (provide by Contractor).
- B. Provide self-drilling screws for metal-framing supports, as recommended by metal-framing manufacturer.
- C. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage.
 1. Provide metal expansion sleeves or expansion bolts for post-installed anchors.
 2. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- D. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- E. Installation Adhesive: Product recommended by fabricator for each substrate for secure anchorage.
 1. Verify adhesives have a VOC content of 70 g/L or less.

2. Verify adhesive complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.4 FABRICATION

- A. Fabricate interior architectural woodwork to dimensions, profiles, and details indicated.
- B. Complete fabrication, including assembly, as indicated.
 1. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting.
 2. Notify Architect seven days in advance of the dates and times interior architectural woodwork fabrication will be complete.

2.5 FINISHING

- A. Finish interior architectural woodwork with transparent finish.
- B. Preparation for Finishing: Comply with Architectural Woodwork Standards, Section 5 for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing interior architectural woodwork, as applicable to each unit of work.
 1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of interior architectural woodwork. Apply two coats to end-grain surfaces.
- C. Transparent Finish: Clear finish as indicated in Section 099300 "Staining and transparent Finish".

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition interior architectural woodwork to humidity conditions in installation areas for not less than 72 hours prior to beginning of installation.
- B. Before installing interior architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming of concealed surfaces.

3.2 INSTALLATION

- A. Grade: Install interior architectural woodwork to comply with same grade as item to be installed.

- B. Assemble interior architectural woodwork and complete fabrication at Project site.
- C. Install interior architectural woodwork level, plumb, true in line, and without distortion.
 - 1. Shim as required with concealed shims.
 - 2. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
- D. Scribe and cut interior architectural woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Anchor interior architectural woodwork to anchors or blocking built in or directly attached to substrates.
 - 1. Secure with countersunk, concealed fasteners and blind nailing.
 - 2. Where exposed fasteners are unavoidable, use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with interior architectural woodwork.
- F. Standing and Running Trim:
 - 1. Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber furnished) to greatest extent possible.
 - 2. Do not use pieces less than 96 inches long, except where shorter single-length pieces are necessary.
 - 3. Scarf running joints and stagger in adjacent and related members.
 - 4. Fill gaps, if any, between top of base and wall with latex sealant, painted to match wall.
 - 5. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches.

3.3 REPAIR

- A. Repair damaged and defective interior architectural woodwork, where possible, to eliminate functional and visual.
- B. Where not possible to repair, replace defective woodwork.
- C. Field Finish: See Section 099300 "Staining and Transparent Finishing" for final finishing of installed interior architectural woodwork not indicated to be shop finished.

3.4 CLEANING

- A. Clean interior architectural woodwork on exposed and semiexposed surfaces.

END OF SECTION 064023

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SECTION 064116 - PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Plastic-laminate-clad architectural cabinets.
2. Cabinet hardware and accessories.
3. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-clad architectural cabinets that are not concealed within other construction.

B. Related Requirements:

1. Section 017419 - Construction and Demolition Waste Management and Disposal
2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
4. Section 061053 "Miscellaneous Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets that are concealed within other construction before cabinet installation.
5. Section 123623 "Plastic-Laminate-Clad Countertops."

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Shop Drawings:
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Show large-scale details.
 - 3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 - 4. Show locations and sizes of cutouts and holes for items installed in plastic-laminate architectural cabinets.
- D. Samples: For each exposed product and for each color and texture specified, in manufacturer's or manufacturer's standard size.
- E. Samples for Initial Selection: For each type of exposed finish.
- F. Samples for Verification: For the following:
 - 1. Plastic Laminates: 8 by 10 inches, for each type, color, pattern, and surface finish required.
 - a. Provide one sample applied to core material with specified edge material applied to one edge.
 - 2. Exposed Cabinet Hardware and Accessories: One full-size unit for each type and finish.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and Installer.
- B. Product Certificates: For the following:
 - 1. Composite wood products.
 - 2. Thermoset decorative panels.
 - 3. High-pressure decorative laminate.
 - 4. Adhesives.
- C. Field quality-control reports.

1.8 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Build mockups of typical architectural cabinets.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.10 FIELD CONDITIONS

- A. Environmental Limitations with Humidity Control: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 43 and 70 percent during the remainder of the construction period.
- B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate

measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.
- C. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 ARCHITECTURAL CABINET MANUFACTURERS

- A. Manufacturers:
1. Subject to compliance with requirements, manufacturer shall be located within 100-miles of the Project Location.
 2. Manufacturer shall have a minimum of five years successful experience manufacturer cabinets similar to those required for the Work of this Contract, and shall be able to provide references and sample projects to verify compliance.

2.3 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Institute Standards for grades of cabinets indicated for construction, finishes, installation, and other requirements.
1. Where the Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.
- B. Architectural Woodwork Standards Grade: Custom.
- C. Regional Materials: Manufacture wood products within 100 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project site.

- D. Certified Wood: Certify wood products as "FSC Pure" in accordance with FSC STD-01-001 and FSC STD-40-004.
- E. Type of Construction: Frameless.
- F. Door and Drawer-Front Style: Flush overlay.
 - 1. Reveal Dimension: 1/2 inch.
- G. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Formica Corporation.
 - b. Pionite; a Panolam Industries International, Inc. brand.
 - c. Wilsonart LLC.
- H. Laminate Cladding for Exposed Surfaces:
 - 1. Horizontal Surfaces: Grade HGS.
 - 2. Vertical Surfaces: Grade HGS.
 - 3. Edges: Grade HGS.
 - 4. Pattern Direction: Vertically for doors and fixed panels, horizontally for drawer fronts.
- I. Materials for Semiexposed Surfaces:
 - 1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, NEMA LD 3, Grade VGS.
 - a. Edges of Plastic-Laminate Shelves: High-pressure decorative laminate, NEMA LD 3, Grade VGS.
 - b. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, NEMA LD 3, Grade VGS.
 - 2. Drawer Sides and Backs: Solid-hardwood lumber.
 - 3. Drawer Bottoms: Hardwood plywood.
- J. Dust Panels: 1/4-inch plywood or tempered hardboard above compartments and drawers unless located directly under tops.
- K. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.
- L. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.

1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners or glued dovetail joints.
- M. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
1. As indicated by laminate manufacturer's designations.
 2. Match Architect's sample.
 3. As selected by Architect from laminate manufacturer's full range in the following categories:
 - a. Solid colors, matte finish.
 - b. Patterns, matte finish.

2.4 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
1. Wood Moisture Content: 5 to 10 percent.
- B. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
1. Recycled Content of MDF and Particleboard: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 20 percent.
 2. Composite Wood Products: Verify products are made using ultra-low-emitting formaldehyde resins, as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products," or are made with no added formaldehyde.
 3. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade 130.
 4. Softwood Plywood: DOC PS 1, medium-density overlay.

2.5 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Accuride International.
 - b. Blum, Julius & Co., Inc.
 - c. Grass America Inc.
 - d. Knappe & Vogt Manufacturing Company.

- B. Frameless Concealed Hinges (European Type): ANSI/BHMA A156.9, B01602, 135 degrees of opening, self-closing.
- C. Wire Pulls: Back mounted, solid metal, [4 inches long, 5/16 inch in diameter.
- D. Shelf Rests: ANSI/BHMA A156.9, B04013; metal.
- E. Drawer Slides: ANSI/BHMA A156.9.
 - 1. Grade 1 and Grade 2: Side mounted and extending under bottom edge of drawer.
 - a. Type: Full extension.
 - b. Material: Zinc-plated steel with polymer rollers.
 - 2. Grade 1HD-100: Side mounted; full-extension type; zinc-plated-steel ball-bearing slides.
- F. Door and Drawer Silencers: ANSI/BHMA A156.16, L03011.
- G. Grommets for Cable Passage: 2-inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.
 - 1. Color: Black.
- H. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with ANSI/BHMA A156.18 for ANSI/BHMA finish number indicated.
 - 1. Satin Stainless Steel: ANSI/BHMA 630.
- I. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in ANSI/BHMA A156.9.
- J. Counter Brackets: Basis of design; RAKKS counter brackets. Metal construction, finish to be selected by architect.

2.6 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- C. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- D. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.

2.7 FABRICATION

- A. Fabricate architectural cabinets to dimensions, profiles, and details indicated.
- B. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
 - 1. Notify Architect seven days in advance of the dates and times architectural cabinet fabrication will be complete.
 - 2. Trial fit assemblies at manufacturer's shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.
- C. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

3.2 INSTALLATION

- A. Architectural Woodwork Standards Grade: Install cabinets to comply with quality standard grade of item to be installed.
- B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.
- C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.
- D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches using concealed shims.
 - 1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration into wood framing, blocking, or hanging strips, No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish or toggle bolts through metal backing or metal framing behind wall finish.

3.3 FIELD QUALITY CONTROL

- A. Inspections: Provide inspection report of installed Work certifying that woodwork, including installation, complies with requirements of the Architectural Woodwork Standards for the specified grade.

3.4 ADJUSTING AND CLEANING

- A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean cabinets on exposed and semiexposed surfaces.

END OF SECTION 064116

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SECTION 071416 - COLD FLUID-APPLIED WATERPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Polyurethane waterproofing.
- 2. Molded Sheet Drainage Panels.

- B. Related Requirements:

- 1. Section 017419 - Construction and Demolition Waste Management and Disposal
- 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
- 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
- 4. Section 033000 "Cast-in-Place Concrete" for substrates.
- 5. Section 044313 "Anchored Stone Masonry Veneer" for masonry products used with products specified in this section and to coordinate mock-up requirements.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1. Review waterproofing requirements including, but not limited to, the following:
 - a. Surface preparation specified in other Sections.
 - b. Minimum curing period.
 - c. Forecasted weather conditions.
 - d. Special details and sheet flashings.
 - e. Repairs.
 - f. Field quality control.
 - g. Coordination of mock-up requirements with Division 4.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, and tested physical and performance properties of waterproofing.
2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.

B. Sustainable Design Submittals:

1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.

C. Shop Drawings:

1. Show locations and extent of waterproofing.
2. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.
3. Include setting drawings showing layout, sizes, sections, profiles, and joint details of pedestal-supported concrete pavers.

D. Samples: For each exposed product and for each color and texture specified, including the following products:

1. Drainage panel, 4 by 4 inches.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Field quality-control reports.

C. Sample Warranties: For special warranties.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.
- B. Mockups: Build mockups to verify selections made under Sample submittals and to set quality standards for installation.
 - 1. Build mockup for each typical waterproofing installation including accessories to demonstrate surface preparation, crack and joint treatments, inside and outside corner treatments, and protection.
 - a. Size: 16 sq. ft. in area.
 - b. Description: Each type of wall installation.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer.
 - 1. Do not apply waterproofing to a damp or wet substrate, when relative humidity exceeds 85 percent, or when temperatures are less than 5 deg F above dew point.
 - 2. Do not apply waterproofing in snow, rain, fog or mist, or when such weather conditions are imminent during application and curing period.
- B. Maintain adequate ventilation during application and curing of waterproofing materials.

1.9 WARRANTY

- A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace waterproofing that fails in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 MANUFACTURERS

- A. Source Limitations for Waterproofing System: Obtain waterproofing materials from single source from single manufacturer.

2.3 SINGLE-COMPONENT POLYURETHANE WATERPROOFING

- A. Single-Component, Modified Polyurethane Waterproofing: ASTM C836.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. CETCO, a Minerals Technologies company, Hydrofix
 - b. Henry Company, Aqua Bloc 720-38
 - c. W.R. Meadows, Hydralastic 836
 - 2. Waterproofing to be low VOC and manufacturer shall provide Environmental Product Declaration (EPD) in accordance with the requirements of Section 018113 “Sustainable Design Requirements”.
 - 3. Properties:
 - a. Solids Content by Weight, % (ASTM C1250): min. 60
 - b. Tensile Strength, psi (ASTM D412): min. 50
 - c. Elongation at Break, % (ASTM D412): min. 425
 - d. Permeability, perm in. (ASTM E96 BW): 0.1
 - e. Shore 00 Hardness (ASTM D2240): 57
 - f. VOC Content, g/L (ASTM D2369): 36

2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials recommended in writing by waterproofing manufacturer for intended use and compatible with one another and with waterproofing.
 - 1. Furnish liquid-type auxiliary materials that comply with VOC limits of waterproofing membrane.

- B. Primer: Manufacturer's standard primer, sealer, or surface conditioner; factory-formulated.
- C. Joint Sealant: Multicomponent polyurethane sealant, compatible with waterproofing; as specified in Section 079200 "Joint Sealants"; and as recommended by manufacturer for substrate and joint conditions.
 - 1. Backer Rod: Closed-cell polyethylene foam.

2.5 MOLDED-SHEET DRAINAGE PANELS

- A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel with Polymeric Film: Composite subsurface drainage panel consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 sieve laminated to one side of the core and a polymeric film bonded to the other side; and with a vertical flow rate through the core of 9 to 21 gpm per ft..
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Carlisle Coatings & Waterproofing Inc; CCW MiraDRAIN 6200 or a comparable product by one of the following:
 - a. BASF Corporation.
 - b. CETCO, a Minerals Technologies company.
- B. Provide required accessories, including fillet at base of wall to footing joint, drain connectors and manufacturer approved adhesives and accessories, as required for a complete installation.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
 - 1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.
 - 2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D4263.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.

- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.
- C. Close off deck drains and other deck penetrations to prevent spillage and migration of waterproofing fluids.
- D. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, acid residues, and other penetrating contaminants or film-forming coatings from concrete.
 - 1. Abrasive blast clean concrete surfaces uniformly to expose top surface of fine aggregate according to ASTM D4259 with a self-contained, recirculating, blast-cleaning apparatus. Remove material to provide a sound surface free of laitance, glaze, efflorescence, curing compounds, concrete hardeners, or form-release agents. Remove remaining loose material and clean surfaces according to ASTM D4258.
- E. Remove fins, ridges, and other projections, and fill honeycomb, aggregate pockets, holes, and other voids.

3.3 PREPARATION AT TERMINATIONS, PENETRATIONS, AND CORNERS

- A. Prepare surfaces at terminations and penetrations through waterproofing and at expansion joints, drains, sleeves, and corners according to waterproofing manufacturer's written instructions and to recommendations in ASTM C898 and ASTM C1471.
- B. Apply waterproofing in two separate applications, and embed a joint reinforcing strip in the first preparation coat when recommended by waterproofing manufacturer.

3.4 JOINT AND CRACK TREATMENT

- A. Prepare, treat, rout, and fill joints and cracks in substrate according to waterproofing manufacturer's written instructions and to recommendations in ASTM C898 and ASTM C1471/C1471M. Before coating surfaces, remove dust and dirt from joints and cracks according to ASTM D4258.
 - 1. Comply with ASTM C1193 for joint-sealant installation.
 - 2. Apply bond breaker on sealant surface, beneath preparation strip.
 - 3. Prime substrate along each side of joint and apply a single thickness of preparation strip at least 6 inches wide along each side of joint. Apply waterproofing in two separate applications and embed a joint reinforcing strip in the first preparation coat.

3.5 WATERPROOFING APPLICATION

- A. Apply waterproofing according to manufacturer's written instructions and to recommendations in ASTM C898 and ASTM C1471.
- B. Start installing waterproofing in presence of manufacturer's technical representative.

- C. Apply primer over prepared substrate unless otherwise instructed in writing by waterproofing manufacturer.
- D. Unreinforced Waterproofing Applications: Mix materials and apply waterproofing by spray, roller, notched squeegee, trowel, or other application method suitable to slope of substrate.
 - 1. Apply one or more coats of waterproofing to obtain a seamless membrane free of entrapped gases and pinholes, with a dry film thickness of 60 mils at site walls and 90 mils at building walls.
 - 2. Apply waterproofing to prepared wall terminations and vertical surfaces.
 - 3. Verify manufacturer's recommended wet film thickness of waterproofing every 100 sq. ft..
- E. Cure waterproofing, taking care to prevent contamination and damage during application and curing.
- F. Install protection course with butted joints over waterproofing before starting subsequent construction operations.
 - 1. Molded-sheet drainage panels are used in place of a separate protection course for vertical applications at the building.
 - 2. At site walls, there is no protection board, to ensure bond of the rubble stone mortar. Take precautions to protect waterproofing and repair any damage prior to the start of rubble stone masonry installation.

3.6 MOLDED-SHEET DRAINAGE PANEL INSTALLATION

- A. Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate, according to manufacturer's written instructions. Use adhesive or another method that does not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.
 - 1. For vertical applications, install thermal insulation specified in Section 072100 "Thermal Insulation" before installing drainage panels.
- B. Molded-Sheet Collector-Panel System: Install according to manufacturer's written instructions. Connect to piped subdrainage system specified in Section 334000 "Storm Sewer Utilities."

3.7 FIELD QUALITY CONTROL

- A. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections:
 - 1. Testing agency shall verify thickness of waterproofing during application for each 600 sq. ft. of installed waterproofing or part thereof.

- B. Manufacturer's Field Service: Engage a site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components and to furnish reports to Architect indicating compliance with requirements.
- C. Waterproofing will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

3.8 PROTECTION

- A. Do not permit foot or vehicular traffic on unprotected membrane.
- B. Protect waterproofing from damage and wear during remainder of construction period.
- C. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.
- D. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

END OF SECTION 071416

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Extruded polystyrene foam-plastic board insulation.
2. Mineral-wool blanket insulation.
3. Spray-applied cellulosic insulation.

B. Related Requirements:

1. Section 017419 - Construction and Demolition Waste Management and Disposal
2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
4. Section 061200 "Structural Insulated Panels (SIPs)" for foam insulation integral to structural wall and roof panels.
5. Section 071416 "Cold Fluid-Applied Waterproofing" for drainage panels installed over foundation insulation.
6. Section 075323 "EPDM Roofing" for insulation at membrane roof assembly.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Extruded polystyrene foam-plastic board insulation.
2. Polyisocyanurate foam-plastic board insulation.
3. Mineral-wool blanket insulation.
4. Spray-applied cellulosic insulation.

B. Sustainable Design Submittals:

1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.

1.4 INFORMATIONAL SUBMITTALS

A. Installer's Certification: Listing type, manufacturer, and R-value of insulation installed in each element of the building thermal envelope.

1. For blown-in or sprayed fiberglass and cellulosic-fiber loose-fill insulation, indicate initial installed thickness, settled thickness, settled R-value, installed density, coverage area, and number of bags installed.
2. Sign, date, and post the certification in a conspicuous location on Project site.

B. Product Test Reports: For each product, for tests performed by a qualified testing agency.

C. Research Reports: For foam-plastic insulation, from ICC-ES.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect foam-plastic board insulation as follows:

1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD INSULATION

- A. To be used at the following locations:
 - 1. Sub-slab insulation
 - 2. Foundations below grade
 - 3. At cavities of adhered stone walls.
- B. Extruded Polystyrene Board Insulation, Type IV: ASTM C578, Type IV, 25-psi minimum compressive strength; unfaced.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Dow Chemical Company (The); FOAMULAR-250-XPS or a comparable product by one of the following:
 - a. Kingspan Insulation Limited.
 - b. Owens Corning.
 - 2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
 - 3. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.
 - 4. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
 - 5. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

2.3 MINERAL-WOOL BLANKET INSULATION

- A. To be used at the following locations:
 - 1. Within framing cavities, where indicated
 - 2. Miscellaneous voids, not indicated to be spray-foamed in Section 061200 “SIPs”
- B. Verify insulation complies with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

- C. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- D. Mineral-Wool Blanket Insulation, Unfaced: ASTM C665, Type IA (blankets without membrane facing); consisting of fibers; passing ASTM E136 for combustion characteristics.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Johns Manville; a Berkshire Hathaway company.
 - b. Rockwool International.
 - c. Thermafiber, Inc.; an Owens Corning company.
 - 2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
 - 3. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.
 - 4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

2.4 SPRAY-APPLIED CELLULOSIC INSULATION

- A. To be located in the following locations:
 - 1. Underside of steel deck at the following:
 - a. MDF 119
 - b. Electrical Room 120
 - c. Mechanical Room 122
- B. Verify insulation complies with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Recycled Content: Total recycled content not less than 80% percent.
- D. Self-Supported, Spray-Applied Cellulosic Insulation: ASTM C1149, Type I chemically treated for flame-resistance, processing, and handling characteristics.
- E. Basis-of-Design Product: Subject to compliance with requirements, provide International Cellulose Corp.; K-13 Spray-on System or a comparable product by one of the following:
 - 1. GreenFiber.
 - 2. Hamilton Manufacturing Inc.
- F. Properties:
 - 1. Thickness and R-Value: 1", Min. R3.5
 - 2. Color: White

3. NRC: 0.75
4. Cohesion/Adhesion – Bond Strength: >100 psf per ASTM E736
5. Fire Performance: Class 1, Class A rated per ASTM E 84, UL 723 and NFPA 255
 - a. Flame Spread: 5
 - b. Smoke Developed: 5
6. Insulation and related products shall not contain silica dust, asbestos, mineral or glass fibers or PCB's.
7. Insulation shall be certified UL Greenguard Gold for low emissions

2.5 ACCESSORIES

- A. Insulation for Miscellaneous Voids:
 1. Mineral-Wool Blanket Insulation, Unfaced: ASTM C665, Type IA.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Install insulation with manufacturer's R-value label exposed after insulation is installed, or provide appropriate documentation of R-value.
- D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF SLAB INSULATION

- A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.
 - 1. If not otherwise indicated, extend insulation a minimum of 36 inches below exterior grade line.
- B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
 - 1. Provide full coverage of insulation under slabs on grade.

3.4 INSTALLATION OF FOUNDATION WALL INSULATION

- A. Butt panels together for tight fit.
- B. Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing according to manufacturer's written instructions.

3.5 INSTALLATION OF CAVITY-WALL INSULATION

- A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches o.c. both ways on inside face and as recommended by manufacturer.
 - 1. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions, and with faces flush.
 - 2. Press units firmly against inside substrates.
 - 3. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Section 044313 "Anchored Stone Masonry Veneer."

3.6 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Where indicated, install in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.

4. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
 5. For wood-framed construction, install blankets according to ASTM C1320.
- B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
1. Mineral Wool Blanket Insulation: Compact to approximately 40 percent of normal maximum volume.
- C. Spray-Applied Cellulosic Insulation: Apply spray-applied insulation according to manufacturer's written instructions.
1. Do not apply insulation until installation of hangers for pipes, ducts, conduits, wiring, fixtures, etc. are completed. Any equipment, fixture or finish installed prior to applying insulation that is not scheduled to be covered shall be masked.
 2. Ensure adequate ventilation and humidity control during and following application of insulation.
 3. After insulation is applied, make flush with face of studs by using method recommended by insulation manufacturer.

3.7 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.
- B. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

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SECTION 072500 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Building paper.

- B. Related Requirements:

- 1. Section 017419 - Construction and Demolition Waste Management and Disposal
 - 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
 - 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
 - 4. Section 061200 "Structural Insulating Panels (SIPs)" for substrates.
 - 5. Section 074113 "Standing Seam Metal Roof Panels" for weather barriers and underlayment at roof.
 - 6. Section 076200 "Sheet Metal Flashing and Trim"

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. For building wrap, include data on air and water-vapor permeance based on testing according to referenced standards.
- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.

1.5 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For water-resistive barrier, from ICC-ES.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2–PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 WATER-RESISTIVE BARRIER

- A. Building Paper: ASTM D226, Type 1 (No. 15 asphalt-saturated organic felt), unperforated.

2.3 UNDERLAYMENT SLIP SHEET

- A. Rosin Paper: 15 lb Red Rosin Paper
 - 1. 3.0 lb/CSF (0.11 mils)
 - 2. Manufactured from 100% recycled fibers.
- B. To be installed, where indicated as a slip sheet between Building Paper and Metal Siding.

PART 3 - EXECUTION

3.1 WATER-RESISTIVE BARRIER INSTALLATION

- A. Cover exposed exterior surface of sheathing with water-resistive barrier securely fastened to SIPs immediately after SIPs panels are installed.
- B. Cover SIPs with water-resistive barrier as follows:
 - 1. Apply barrier to cover vertical flashing with a minimum 8-inch overlap unless otherwise indicated.
- C. Building Paper: Apply horizontally with an 8-inch overlap and a 12-inch end lap; fasten to sheathing with galvanized staples or roofing nails.
- D. Building Wrap: Comply with manufacturer's written instructions and warranty requirements.
 - 1. Seal seams, edges, fasteners, and penetrations with tape.
 - 2. Extend into jambs of openings and seal corners with tape.

3.2 UNDERLAYMENT SLIP SHEET INSTALLATION

- A. Cover exposed exterior surface of Building Paper at locations indicated to have metal siding with Red Rosin paper slip sheet securely fastened to SIP's immediately after SIPs panels are installed.
- B. Cover Building paper to extents indicated as follows:
 - 1. Apply slip sheet to cover vertical flashing with a minimum 8-inch overlap unless otherwise indicated.
- C. Slip Sheet: Apply horizontally with an 8-inch overlap and a 12-inch end lap; fasten to sheathing with galvanized staples or roofing nails.
- D. Slip Sheet: Comply with manufacturer's written instructions and warranty requirements.

END OF SECTION 072500

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SECTION 073116 - METAL SHINGLE SIDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Metal shingles.

- B. Related Requirements:

- 1. Section 017419 - Construction and Demolition Waste Management and Disposal
 - 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
 - 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
 - 4. Section 061200 "Structural Insulated Panels (SIPs)" for substrates.
 - 5. Section 072500 "Weather Barriers" for underlayment materials.
 - 6. Section 074113 "Standing-Seam Metal Roof Panels" for sheet metal roofing panels that are installed as single panels extending from eave to ridge.
 - 7. Section 074643 "Composite Siding and Trim" for siding and trim not indicated to be metal.
 - 8. Section 076200 "Sheet Metal Flashing and Trim" for sheet metal and trim not specified in this Section.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 DEFINITIONS

- A. Roofing Terminology: See ASTM D1079 for definitions of terms related to roofing Work in this Section.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each of the following:
 - 1. Metal shingles.
 - 2. Bituminous coating.
 - 3. Sealant.
- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Shop Drawings: For metal shingles. Include elevations; details of metal shingles and joint patterns, flashing, trim, accessories, and attachments to other Work.
- D. Samples: For each exposed product and for each color and texture specified, in manufacturer's standard size.
- E. Samples for Initial Selection:
 - 1. For each type of metal shingle.
 - 2. For each type of accessory involving color selection.
- F. Samples for Verification: (3) Full-size Samples of each type and finish of metal shingle indicated, able to be assembled to demonstrate horizontal and vertical seaming.

1.7 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For metal shingles, for tests performed by a qualified testing agency.
- B. Sample Warranty: For manufacturer's materials warranty.

1.8 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For metal shingles to include in maintenance manuals.
- B. Materials warranties.

1.9 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Build mockups of metal shingles, including related roofing materials.
 - a. Size: 48 inches high by 72 inches wide.
 - b. Include corner, trim and edge condition.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Store metal shingle materials in a dry, well-ventilated location protected from weather and moisture in accordance with manufacturer's written instructions. Do not allow metal shingles to contact with other materials that might cause staining, denting, or other surface damage. Store metal shingle materials away from uncured and wet concrete and masonry.
 - 1. Retain strippable protective covering on metal shingles during installation.
- B. Store underlayment rolls specified in Section 072500 "Weather Barriers" in a dry, well-ventilated location protected from weather, sunlight, and moisture in accordance with manufacturer's written instructions.
 - 1. Store on end, on pallets or other raised surfaces.
 - 2. Do not double-stack rolls.
- C. Protect unused underlayment from weather, sunlight, and moisture when left overnight or when Work is not in progress.
- D. Handle, store, and place siding materials in a manner to prevent damage to substrates or structural supporting members.

1.11 FIELD CONDITIONS

- A. Environmental Limitations: Proceed with installation only when existing and forecasted weather conditions permit product installation and related Work to be performed in accordance with manufacturer's written instructions and warranty requirements.

1.12 WARRANTY

- A. Materials Warranty: Manufacturer agrees to repair or replace metal shingles and accessories that fail within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including wind uplift.
 - b. Water penetration and hail perforation.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. High-Performance Organic Coating: Deterioration of fluoropolymer finish including, but not limited to, the following:
 - 1) Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
 - 2) Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
 - 3) Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Metal Shingle Warranty Period: 15 years from date of Substantial Completion.
 - 3. High-Performance Organic Coating Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 SOURCE LIMITATIONS

- A. Obtain each type of product from single source from single manufacturer.

2.3 PERFORMANCE REQUIREMENTS

- A. Exterior Fire-Test Exposure: Provide metal shingles and related materials identical to those of assemblies tested for Class A fire resistance in accordance with ASTM E108 or UL 790 by Underwriters Laboratories or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.
- B. Aluminum, Individual Shingles: Factory-formed, interlocking rectangular shingle units.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Atas, VersaLok, VSL 123 or comparable product by one of the following:
 - a. Reinke Shakes; Division of Jame Kari LLC.
 - b. Zappone Manufacturing.
 - 2. Material: Formed aluminum, 0.032 inch thick.
 - 3. Exposure: 12 by 36 inches.
 - 4. Surface: Smooth finish
 - 5. Finish: High-performance organic coating, 70% PVDF coating.
 - a. Color: As selected by Architect from manufacturer's full range.
- C. Finish Protection: Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

2.4 SHEET METAL MATERIALS

- A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.
- B. Aluminum Sheet: ASTM B209, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.
 - 1. High-Performance Organic Coating (Coil-Coated Finishes): Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Two-Coat Fluoropolymer: AAMA 2605. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight.
 - 2. Concealed Surface: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat and with a minimum total dry film thickness of 0.5 mil.

2.5 UNDERLAYMENT MATERIALS

- A. As indicated in Section 072500 "Weather Barriers".

2.6 SHEET METAL FLASHING AND TRIM

- A. Sheet Metal Flashing and Trim: Metal shingle manufacturer's flashing and trim components matching shingle material, color, and finish unless otherwise specified in this Section, indicated on Drawings, or recommended in writing by metal shingle manufacturer. Fabricate to sizes and configurations required for a weathertight installation. Unless otherwise specified in this Section or indicated on Drawings, fabricate sheet metal flashing and trim to comply with recommendations that apply to design, dimensions, metal, and other characteristics of the item in SMACNA's "Architectural Sheet Metal Manual."

2.7 ACCESSORIES

- A. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- B. Sealant: ASTM C920, Type S, Grade NS, one-part, non-sag elastomeric polymer joint sealant as recommended in writing by metal shingle manufacturer for installation indicated; of class and use classifications required to seal joints and remain watertight. Where sealant is exposed, provide in color matching shingle.
- C. Sheet Metal Fasteners: Noncorrosive screws, nails, and anchors designed to withstand design loads and recommended in writing by metal shingle manufacturer.
 - 1. Exposed Fasteners: Heads matching color of metal shingles using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC washers under heads of exposed fasteners bearing on weather side of shingles.
 - 2. Fasteners for Flashing and Trim: Blind fasteners per manufacturer's standard.
 - 3. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking, that tops of fasteners are flush with surface, and that installation is within flatness tolerances.
 - 2. Verify that substrate is sound, dry to the maximum moisture content recommended in writing by metal shingle manufacturer, smooth, clean, sloped for drainage, and completely anchored and that provisions have been made for flashings and penetrations through metal shingles.
 - 3. Verify that windows, doors and other penetrations are installed and securely fastened.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF UNDERLAYMENT MATERIALS

- A. As indicated in Section 072500 "Weather Barriers".

3.3 INSTALLATION OF SHEET METAL FLASHINGS AND TRIM

- A. Install metal flashings and trim in accordance with manufacturer's written instructions and recommendations in SMACNA's "Architectural Sheet Metal Manual", unless more stringent requirements are specified in this Section or indicated on Drawings.
 - 1. Install with minimum 4-inch end laps.

3.4 INSTALLATION OF ACCESSORIES

- A. Install accessories in accordance with manufacturers' written instructions unless more stringent requirements are specified in this Section or indicated on Drawings.
- B. Metal Protection: Where dissimilar metals contact each other, protect against galvanic action by painting contact surfaces with bituminous coating, by applying self-adhering, polymer-modified bitumen sheet to each contact surface, or by other means of permanent separation recommended in writing by manufacturer of metal shingles or of the metals in contact.

3.5 INSTALLATION OF METAL SHINGLES

- A. Install metal shingles in accordance with manufacturer's written instructions true in line.
- B. Maintain uniform exposure and coursing of metal shingles throughout roof.
- C. Apply sealant between shingles, flashing, trim, and exposed fasteners to achieve a weathertight system.
- D. Interlock and overlap shingles, and stagger end joints from shingle courses above and below.
 - 1. Stagger 1/3 panel width
 - 2. Install east to west at north wall and north to south at east wall.
- E. Metal Protection: Where dissimilar metals contact each other, protect against galvanic action by painting contact surfaces with bituminous coating, by applying self-adhering, polymer-modified bitumen sheet to each contact surface, or by other means of permanent separation recommended in writing by manufacturer of metal shingles or of the metals in contact.
 - 1. Do not use graphite pencils to mark metal surfaces.

3.6 ADJUSTING

- A. Remove and replace damaged or deformed metal shingles. Replace shingles with damaged or deteriorated finishes and other components of the Work that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as metal shingles are installed unless otherwise indicated in manufacturer's written installation instructions.
- C. On completion of installation, touch up minor nicks and abrasions in finish, in accordance with manufacturer's written instructions.
- D. Remove excess sealants.

END OF SECTION 073116

SECTION 074113 - STANDING-SEAM METAL ROOF PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Standing-seam metal roof panels.
- 2. Underlayment Materials

- B. Related Sections:

- 1. Section 017419 - Construction and Demolition Waste Management and Disposal
- 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
- 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
- 4. Section 061200 "Structural Insulated Panels (SIPs)" for substrates.
- 5. Section 073116 "Metal Shingle Siding" for sheet metal siding.
- 6. Section 074643 "Composite Siding and Trim" for siding and trim for fasciae and soffits.
- 7. Section 076200 "Sheet Metal Flashing and Trim" for sheet metal and trim not specified in this Section and for roof-drainage sheet metal fabrications.
- 8. Section 077253 "Snow Guards" for prefabricated devices designed to hold snow on the roof surface, allowing it to melt and drain off slowly.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of roof accessories and roof-mounted equipment.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
5. Review structural loading limitations of deck during and after roofing.
6. Review flashings, special details, drainage, penetrations, equipment curbs, and condition of other construction that affect metal panels.
7. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
8. Review temporary protection requirements for metal panel systems during and after installation.
9. Review procedures for repair of metal panels damaged after installation.
10. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

B. Sustainable Design Submittals:

1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
2. Product Test Reports: For roof materials, documentation indicating that roof materials comply with Solar Reflectance Index requirements.

C. Shop Drawings:

- a. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
- b. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.

- D. Samples for Initial Selection: For each type of metal panel indicated with factory-applied color finishes.
 - 1. Include similar Samples of trim and accessories involving color selection.
- E. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
 - 1. Metal Panels: 12 inches long by actual panel width. Include clips, fasteners, closures, and other metal panel accessories.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- C. Field quality-control reports.
- D. Sample Warranties: For special warranties.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For metal panels to include in maintenance manuals.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.
- C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Build mockup of typical roof area and eave, including fascia, and soffit as shown on Drawings; approximately 12 feet square by full thickness, including attachments, underlayment, and accessories.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal panels during installation.

1.10 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.11 COORDINATION

- A. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.
- B. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.12 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering.
 - 2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

- a. Color fading more than 5 Delta E units when tested according to ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 20 years from date of Substantial Completion.
- C. Special Weathertightness Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.
1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Solar Reflectance Index (SRI): Three-year-aged SRI not less than 32 or initial SRI not less than 39 when calculated according to ASTM E 1980, based on testing identical products by a qualified testing agency.
- C. Energy Performance: Provide roof panels that are listed on the EPA/DOE's ENERGY STAR "Roof Product List" for low-slope roof products.
- D. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:
 1. Wind Loads: As indicated on Drawings.
 2. Other Design Loads: PV Panels and clips, as indicated.
 3. Deflection Limits: For wind loads, no greater than 1/180 of the span.
- E. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E1680 at the following test-pressure difference:
 1. Test-Pressure Difference: 6.24 lbf/sq. ft..
- F. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E1646 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft..
- G. Hydrostatic-Head Resistance: No water penetration when tested according to ASTM E2140.
- H. FM Global Listing: Provide metal roof panels and component materials that comply with requirements in FM Global 4471 as part of a panel roofing system and that are listed in FM Global's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Global markings.
 1. Fire/Windstorm Classification: Class 1A-75.
 2. Hail Resistance: MH.
- I. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces

2.3 STANDING-SEAM METAL ROOF PANELS

- A. Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.
 1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E1514.
- B. Vertical-Rib, Seamed-Joint, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and a flat pan between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and mechanically seaming panels together.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Morin - A Kingspan Group Company; 685 Middle Street, Bristol, Connecticut 06010; Basis of Design Product SymmeTry Roof Series or a comparable product by one of the following:
 - a. ATAS International, Inc.
 - b. Berridge Manufacturing Company.
 - c. Drexel Metals.
 2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A653/A653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A792/A792M, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755/A755M.

- a. Nominal Thickness: 24 gauge.
 - b. Exterior Finish: Two-coat fluoropolymer.
 - c. Color: As selected by Architect from manufacturer's full range.
3. Clips: Manufacturer's standard Two-piece floating to accommodate thermal movement.
- a. Material: Manufacture's standard to comply with requirements.
4. Joint Type: Single folded.
5. Panel Coverage: 16 inches.
6. Panel Height: 1.5 inches.

2.4 UNDERLAYMENT MATERIALS

- A. Felt Underlayment: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felts.
- B. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.

2.5 MISCELLANEOUS MATERIALS

- A. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- B. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- C. Roof Curbs: Fabricated from same material as roof panels, 0.048-inch nominal thickness; with bottom of skirt profiled to match roof panel profiles and with welded top box and integral full-length cricket. Fabricate curb subframing of 0.060-inch-nominal thickness, angle-, C-, or Z-shaped steel sheet. Fabricate curb and subframing to withstand indicated loads of size and height indicated. Finish roof curbs to match metal roof panels.
 1. Insulate roof curb with 1-inch-thick, rigid insulation.
- D. Panel Fasteners: Self-tapping screws designed to withstand design loads.

- E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
 - 2. Joint Sealant: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
 - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

2.6 FABRICATION

- A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.
- C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
 - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
 - 2. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
 - 3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
 - 4. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
 - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal panel manufacturer for application, but not less than thickness of metal being secured.

2.7 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Steel Panels and Accessories:
 - 1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
 - 1. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.
 - 2. 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.
 - a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C754 and metal panel manufacturer's written recommendations.

3.3 INSTALLATION OF UNDERLAYMENT

- A. Felt Underlayment: Apply at locations indicated below, in shingle fashion to shed water, and with lapped joints of not less than 4 inches.
 - 1. Apply over the entire roof surface.
- B. Slip Sheet: Apply slip sheet over underlayment before installing metal roof panels.
- C. Flashings: Install flashings to cover underlayment to comply with requirements specified in Section 076200 "Sheet Metal Flashing and Trim."

3.4 INSTALLATION OF STANDING SEAM METAL ROOF PANELS

- A. Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Shim or otherwise plumb substrates receiving metal panels.
 - 2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
 - 3. Install screw fasteners in predrilled holes.
 - 4. Locate and space fastenings in uniform vertical and horizontal alignment.
 - 5. Install flashing and trim as metal panel work proceeds.
 - 6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
 - 7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
 - 8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners:
 - 1. Steel Panels: Use stainless steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.
- C. Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.
- D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
- E. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
 - 1. Install clips to supports with self-tapping fasteners.

2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
 3. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.
 4. Watertight Installation:
 - a. Apply a continuous ribbon of sealant or tape to seal joints of metal panels, using sealant or tape as recommend in writing by manufacturer as needed to make panels watertight.
 - b. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
 - c. At panel splices, nest panels with minimum 6-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.
- F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal roof panel manufacturers; or, if not indicated, types recommended by metal roof panel manufacturer.
- G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof and weather-resistant performance.
 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- H. Roof Curbs: Install flashing around bases where they meet metal roof panels.
- I. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to metal roof panels as recommended by manufacturer.

3.5 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align metal panel units within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.6 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect metal roof panel installation, including accessories. Report results in writing.
- B. Remove and replace applications of metal roof panels where tests and inspections indicate that they do not comply with specified requirements.
- C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- D. Prepare test and inspection reports.

3.7 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074113

SECTION 074643 - COMPOSITE SIDING and TRIM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fiber reinforced hybrid siding, soffits and trim.

1.2 RELATED SECTIONS

- A. Section 017419 - Construction and Demolition Waste Management and Disposal
- B. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
- C. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
- D. Section 061200 – Structural Insulated Panels
- E. Section 076000 - Flashing and Sheet Metal.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- a. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 2. ASTM D1037 - Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials.
 - 3. ASTM D2395 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Wood and Wood-Based Materials.
 - 4. ASTM D3345 - Standard Test Method for Laboratory Evaluation of Solid Wood for Resistance to Termites.
- B. International Organization for Standardization (ISO):
 - 1. ISO 178 - Plastics -- Determination of Flexural Properties.
 - 2. ISO 527 - Plastics -- Determination of Tensile Properties -- Part 1: General Principles.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 33 00 – “Submittal Procedures”.
- B. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project’s LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Product Data:
 - 1. Manufacturer's data sheets on each product to be used.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Typical installation methods.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches square representing actual product, color, and patterns.
- F. Shop Drawings: Include details of materials, construction and finish. Include relationship with adjacent construction.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.
- B. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.
- C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.
- D. Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up as acceptable to Architect and provide temporary foundations and support.
 - 1. Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
 - 2. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
 - 3. Retain mock-up during construction as a standard for comparison with completed work.
 - 4. Do not alter or remove mock-up until work is completed or removal is authorized.

1.7 PRE-INSTALLATION CONFERENCE

- A. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
- B. Protect from damage due to weather, excessive temperature, and construction operations.

1.9 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.10 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.11 WARRANTY

- A. Manufacturer's Warranty: Provide manufacturer's standard limited warranty.
 - 1. Warranty that products will be free from defects in materials and manufacturing workmanship for 15 years (commercial) as stated below. Warrant that the products shall be free from defects in workmanship and materials that (1) occur as a direct result of the manufacturing process, (2) occur during the warranty period and (3) have structural damage or fungal decay.

PART 2 PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- a. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2–PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 MANUFACTURERS

- A. The Basis of Design Manufacturer is Resysta North America, Inc., which is located at: 4035 Cheyenne Ct.; Chino, CA 91710; Tel: 909-393-2888; Fax: 909-393-2831; Email:request info (info@resystausa.com); Web:http://resystausa.com. Subject to compliance with requirements, provided specified products, or equivalent products from another manufacturer including, but not limited to the following:
 - 1. dassoXTR, Fused Bamboo Siding, Atlanta, GA
 - 2. MOSO Bamboo X-treme Siding, Milford, DE
- B. Requests for substitutions will be considered in accordance with provisions of Section 01 25 00 – “Substitution Procedures”.

2.3 PERFORMANCE AND DESIGN REQUIREMENTS

- A. Code Compliance:

1. Building and Fire Codes as indicated.
2. Siding complies with Section 2605.3 of the IBC and FBC for use as an exterior plastic veneer.

B. Standards Compliance:

1. Code Compliance Research Report (CCRR)-0272 as prepared by Intertek issued 5-30-2018.

2.4 PRODUCT TYPES

A. Basis of Design: Siding as manufactured and supplied by Resysta.

1. Construction: Mono extruded, rigid plastic composite siding consisting of polyvinyl chloride and organic hull fillers. Simulated wood grain pattern.

B. Siding 6 inches Profile:

1. Siding Profile: 6 inches.
2. Model: RESCP120612.
3. Dimensions (W x H x L): 1/2 x 6 x 144 inches.

C. Soffits and Fascia:

1. Same material as siding, in sizes and profiles indicated.

D. System:

1. Installation shall comply with the CCRR and the manufacturer's requirements.
2. Siding shall be installed over steel, aluminum or wood battens over structural wood sheathing; 5/8 inch plywood complying with DOC PS 1, DOC PS 2, or ANSI/APA PRP 210, per IBC 2303.1.5.
3. Sheathing shall be covered by an approved water resistive barrier complying with 1404.2 of the IBC and FBC, and Section R703.1.1 of the IRC, and provide a means of draining water that enters the assembly to the exterior.
4. Protection against condensation shall be provided in accordance with Section 1405.3 of the IBC and FBC.
5. Flashing shall be installed in accordance with Section 1405.4 of the IBC and FBC, and IRC Section R703.8.
6. Trim: Provide manufacturer's standard corners, transition and termination components in metal color matched to siding.

E. Material:

1. Polyvinyl chloride.
2. Rice Husks: Approximately 60 percent.
3. Common Salt: Approximately 22 percent.
4. Mineral Oil: Approximately 18 percent.

F. Siding is 100 percent recyclable within the manufacturing process.

- G. Material Characteristics:
1. Density (ASTM D2395): Approximately 0.844 oz per cu inch.
 2. Water Absorption and Humidity (ASTM D1037): Little up to no water absorption (only surface moistening).
 3. Weathering and UV Resistance (QUV Test): With glaze treatment, Resysta surfaces are extremely resistant.
 4. Fire Rating According NFPA (ASTM E84): Class A (flame propagation 25, smoke emission 450).
 5. Durability Resistance Against Wood Destroying Fungi (basidiomycetes) (DIN V EN V12038): The material has not been affected, highest durability- Class 1.
 6. Emission LGA-tested safety and LGA test passed contamination.
 7. Brinell Hardness (EN 1534): 11762.6 lbs per sq in (81.1 N per sq mm).
 8. Axial Withdrawal Force (of Screws) (EN 320.2011): 1298.7 lbf (5777 N).
 9. Thermal Conductivity (EN 12664): 0.115 btu per hr ft F(0.199 W per m K).
 10. Water Vapor Transmission (DIN EN ISO 12572): 1298.7 lbf (5777 N).
 11. Bending Strength (ISO 178): 6671.7 lbs per sq in (46 N per sq mm).
 12. Bending Modulus (ISO 178): 558395.3 lbs per sq in (3850 N per sq mm).
 13. Tensile Strength (ISO 527): 3161.8 lbs per sq in (21.8 N per sq mm).
 14. Tensile Modulus (ISO 527): 339388.3 lbs per sq in (2340 N per sq mm).
 15. Tensile Modulus (ISO 527): 399388.3 lbs per sq in (2340 N per sq mm).
 16. Shearing Strength (EN 392): 2436.6 lbs per sq in (16.8 N per sq mm).
 17. Durability - Resistance Against Rotting Fungi (CEN/TS 15083-2): No attack by the test fungi, highest durability class 1 (very durable).
 18. Durability Against Mold Fungi and Wood Discoloring Fungi (EN 15534-1): Durability against the wood discoloring fungi (very durable).
 19. Durability Against Subterranean Termites (ASTM D3345): High Durability against subterranean Termites - nearly no weight loss.
 20. Specific Surface and Volume Resistances (DIN IEC 60093) Measuring Voltage 100V
Surface Resistance: 8.0 x 10(13) Ohms:
 - a. Specific Surface Resistance: 8.1 x10(14) Ohms.
 - b. Volume Resistance: 2.2 x 10(13) Ohms.
 - c. Specific Volume Resistance: 6.3 x 10(14) Ohms.

2.5 FINISH

- A. System:
1. Stain: FVG-C Transparent Colored Stain. Water-based stain for the color design of surfaces.
 2. Factory Applied Sealer: RSI UV. UV cured.
 3. Color: To be selected by Architect from manufacturer's full range of standard options.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly constructed and prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.2 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.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions approved submittals and in proper relationship with adjacent construction.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.
- B. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.

3.5 CLEANING AND PROTECTION

- A. Clean products in accordance with the manufacturer's recommendations.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 075323 - ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Adhered ethylene-propylene-diene-terpolymer (EPDM) roofing system.
2. Cover board.
3. Insulation

B. Related Requirements:

1. Section 017419 - Construction and Demolition Waste Management and Disposal
2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
4. Section 053100 "Steel Decking" for substrates.
5. Section 072100 "Thermal Insulation" for insulation beneath EPDM Roofing and Coverboard.
6. Section 076200 "Sheet Metal Flashing and Trim" for metal roof flashings and counterflashings, and for roof-drainage assemblies.
7. Section 077100 "Roof Specialties" for manufactured roof edge metal and trim.
8. Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D1079 and glossary of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to work of this Section.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Roofing Conference: Conduct conference at Project site.
 - 1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, air barrier Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 - 3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Examine deck substrate conditions and finishes, including flatness and fastening.
 - 5. Review structural loading limitations of roof deck during and after roofing.
 - 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
 - 7. Review governing regulations and requirements for insurance and certificates if applicable.
 - 8. Review temporary protection requirements for roofing system during and after installation.
 - 9. Review roof observation and repair procedures after roofing installation.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. For roof system component fasteners, include copy of FM Approvals' RoofNav listing.
- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:
 - 1. Layout and thickness if insulation.
 - 2. Base flashings and membrane terminations.
 - 3. Flashing details at penetrations.
 - 4. Tapered insulation, thickness, and slopes.

5. Roof plan showing orientation of steel roof deck and orientation of roof membrane and fastening spacings and patterns for mechanically fastened roofing system.
6. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

D. Samples for Verification: For the following products:

1. Roof membrane and flashings of color required.

E. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Manufacturer Certificates:

1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

- a. Submit evidence of complying with performance requirements.

2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.

C. Product Test Reports: For components of roof membrane and insulation, for tests performed by a qualified testing agency, indicating compliance with specified requirements.

D. Evaluation Reports: For components of roofing system, from ICC-ES.

1. Field Test Reports:

2. Concrete internal relative humidity test reports.

3. Fastener-pullout test results and manufacturer's revised requirements for fastener patterns.

E. Field quality-control reports.

F. Sample Warranties: For manufacturer's special warranties.

1.8 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.

1.9 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is listed in FM Approvals' RoofNav for roofing system identical to that used for this Project.
- B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.11 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.12 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
 - 1. Special warranty includes roof membrane, base flashings, roof insulation, fasteners, cover boards and other components of roofing system.
 - 2. Warranty Period: 20 years from Date of Substantial Completion.
- B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of

roofing system such as roof membrane, base flashing, roof insulation, fasteners and cover boards, for the following warranty period:

1. Warranty Period: Two years from Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing system and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and flashings shall remain watertight.
 1. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
 2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746, ASTM D4272, or the Resistance to Foot Traffic Test in FM Approvals 4470.
- B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.
- C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474:
 1. Zone 1 (Roof Area Field): 90 lbf/sq. ft..
 2. Zone 2 (Roof Area Perimeter): 150 lbf/sq. ft.>.
 3. Zone 3 (Roof Area Corners): 210 lbf/sq. ft..
- D. Solar Reflectance Index (SRI): Three-year-aged SRI not less than 64 or initial SRI not less than 80 when calculated according to ASTM E 1980, based on testing identical products by a qualified testing agency.
- E. ENERGY STAR Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.

- F. Exterior Fire-Test Exposure: ASTM E108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.3 ETHYLENE-PROPYLENE-DIENE-TERPOLYMER (EPDM) ROOFING

- A. EPDM Sheet: ASTM D4637, Type I, nonreinforced, EPDM sheet.
 - 1. *Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:*
 - a. *Carlisle SynTec Incorporated.*
 - b. *GenFlex Roofing Systems.*
 - c. *Johns Manville; a Berkshire Hathaway company.*
 - 2. Thickness: 60 mils, nominal.
 - 3. Exposed Face Color: White.
 - 4. Source Limitations: Obtain components for roofing system from roof membrane manufacturer or manufacturers approved by roof membrane manufacturer.

2.4 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.
 - 1. Adhesive and Sealants: Comply with VOC limits of authorities having jurisdiction.
 - 2. Verify adhesives and sealants comply with the following limits for VOC content:
 - a. Plastic Foam Adhesives: 50 g/L.
 - b. Gypsum Board and Panel Adhesives: 50 g/L.
 - c. Multipurpose Construction Adhesives: 70 g/L.
 - d. Fiberglass Adhesives: 80 g/L.
 - e. Contact Adhesives: 80 g/L.
 - f. PVC Welding Compounds: 510 g/L.
 - g. Other Adhesives: 250 g/L.
 - h. Single-Ply Roof Membrane Sealants: 450 g/L.
 - i. Nonmembrane Roof Sealants: 300 g/L.
 - j. Sealant Primers for Nonporous Substrates: 250 g/L.
 - k. Sealant Primers for Porous Substrates: 775 g/L.
- B. Sheet Flashing: 60-mil-thick EPDM, partially cured or cured, according to application.
- C. Bonding Adhesive: Manufacturer's standard, water based.
- D. Seaming Material: Manufacturer's standard, synthetic-rubber polymer primer and 3-inch-wide minimum, butyl splice tape with release film.

- E. Lap Sealant: Manufacturer's standard, single-component sealant, colored to match membrane roofing.
- F. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.
- G. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.
- H. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, prepunched.
- I. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening components to substrate, and acceptable to roofing system manufacturer.
- J. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, molded pipe boot flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.
 - 1. Provide white flashing accessories for white EPDM membrane roofing.

2.5 POLYISOCYANURATE FOAM-PLASTIC BOARD INSULATION

- A. To be used at the following locations:
 - 1. Insulation as part of EPDM Roofing Assembly.
- B. Polyisocyanurate Board Insulation, Glass-Fiber-Mat Faced: ASTM C1289, glass-fiber-mat faced, Type II, Class 2.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Carlisle Coatings & Waterproofing Inc.
 - b. Firestone Building Products.
 - c. Johns Manville; a Berkshire Hathaway company.
 - 2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
 - 3. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.
- C. deck.

2.6 VAPOR RETARDER

- A. Polyethylene Film: ASTM D4397, 6 mils thick, minimum, with maximum permeance rating of 0.13 perm.
 - 1. Tape: Pressure-sensitive tape of type recommended by vapor retarder manufacturer for sealing joints and penetrations in vapor retarder.
 - 2. Adhesive: Manufacturer's standard lap adhesive, listed by FM Approvals for vapor retarder application.

2.7 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with other roofing system components.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.
- C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
 - 1. Modified asphaltic, asbestos-free, cold-applied adhesive.
 - 2. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
 - 3. Full-spread, spray-applied, low-rise, two-component urethane adhesive.
 - 4. Verify adhesives and sealants comply with the following limits for VOC content:
 - a. Plastic Foam Adhesives: 50 g/L.
 - b. Gypsum Board and Panel Adhesives: 50 g/L.
 - c. Multipurpose Construction Adhesives: 70 g/L.
 - d. Fiberglass Adhesives: 80 g/L.
 - e. Contact Adhesives: 80 g/L.
 - f. PVC Welding Compounds: 510 g/L.
 - g. Other Adhesives: 250 g/L.
 - h. Single-Ply Roof Membrane Sealants: 450 g/L.
 - i. Nonmembrane Roof Sealants: 300 g/L.
 - j. Sealant Primers for Nonporous Substrates: 250 g/L.
 - k. Sealant Primers for Porous Substrates: 775 g/L.
- D. Cover Board: ASTM C1177/C1177M, glass-mat, water-resistant gypsum substrate, or ASTM C1278/C1278M, fiber-reinforced gypsum board.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Georgia-Pacific Gypsum LLC.
 - b. National Gypsum Company.

- c. USG Corporation.
- 2. Thickness: 1/4 inch.
- 3. Surface Finish: Factory primed.

2.8 ASPHALT MATERIALS

- A. Roofing Asphalt: ASTM D312/D312M, Type III or Type IV.
- B. Asphalt Primer: ASTM D41/D41M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
 - 1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
 - 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 - 3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 053100 "Steel Decking."
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing system installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Perform fastener-pullout tests according to roof system manufacturer's written instructions.
 - 1. Submit test result within 24 hours of performing tests.
 - a. Include manufacturer's requirements for any revision to previously submitted fastener patterns required to achieve specified wind uplift requirements.

3.3 INSTALLATION OF ROOFING, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions, FM Approvals' RoofNav assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
- C. Install roof membrane and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition.

3.4 INSTALLATION OF INSULATION

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at end of workday.
- B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Installation Over Metal Decking:
 - 1. Install base layer of insulation with joints staggered not less than 24 inches in adjacent rows, end joints staggered not less than 12 inches in adjacent rows and with long joints continuous at right angle to flutes of decking.
 - a. Locate end joints over crests of decking.
 - b. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
 - c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - d. Make joints between adjacent insulation boards not more than 1/4 inch in width.
 - e. At roof drains scuppers, slope insulation to create crickets to ensure flow to drain.
 - 1) Trim insulation so that water flow is unrestricted.
 - f. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations. Fill all gaps with insulation
 - g. Mechanically attach base layer of insulation using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks.
 - 1) Fasten insulation according to requirements in FM Approvals' RoofNav for specified Windstorm Resistance Classification.
 - 2) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.

2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches from previous layer of insulation.
 - a. Staggered end joints within each layer not less than 24 inches in adjacent rows.
 - b. Install with long joints continuous and with end joints staggered not less than 12 inches in adjacent rows.
 - c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting surfaces.
 - d. Make joints between adjacent insulation boards not more than 1/4 inch in width.
 - e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
 - f. Trim insulation so that water flow is unrestricted.
 - g. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations. Fill gaps with insulation.
 - h. Adhere each layer of insulation to substrate using adhesive according to FM Approvals' RoofNav listed roof assembly requirements for specified Windstorm Resistance Classification and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
 - 1) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.5 INSTALLATION OF VAPOR RETARDER

- A. Polyethylene Film: Loosely lay polyethylene-film vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 and 6 inches, respectively.
 1. Extend vertically up parapet walls and projections to a minimum height equal to height of insulation and cover board.
 2. Continuously seal side and end laps with tape.

3.6 INSTALLATION OF COVER BOARDS

- A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction.
 1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 2. At internal roof drains, conform to slope of drain sump.
 - a. Trim cover board so that water flow is unrestricted.
 3. Cut and fit cover board tight to nailers, projections, and penetrations.

4. Adhere cover board to substrate using adhesive according to FM Approvals' RoofNav listed roof assembly requirements for specified Windstorm Resistance Classification and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
 - a. Set cover board in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.7 INSTALLATION OF ADHERED ROOF MEMBRANE

- A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.
- B. Unroll membrane roof membrane and allow to relax before installing.
- C. Start installation of roofing in presence of roofing system manufacturer's technical personnel and Owner's testing and inspection agency.
- D. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- E. Bonding Adhesive: Apply to substrate and underside of roof membrane at rate required by manufacturer, and allow to partially dry before installing roof membrane. Do not apply to splice area of roof membrane.
- F. In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeters.
- G. Apply roof membrane with side laps shingled with slope of roof deck where possible.
- H. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement.
 1. Firmly roll side and end laps of overlapping roof membrane to ensure a watertight seam installation.
 2. Apply lap sealant and seal exposed edges of roofing terminations.
 3. Apply a continuous bead of in-seam sealant before closing splice if required by roofing system manufacturer.
- I. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape.
 1. Firmly roll side and end laps of overlapping roof membrane to ensure a watertight seam installation.
 2. Apply lap sealant and seal exposed edges of roofing terminations.
- J. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.
- K. Spread sealant or mastic bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

- L. Adhere protection sheet over roof membrane at locations indicated.

3.8 INSTALLATION OF BASE FLASHING

- A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Owner may engage a qualified testing agency to inspect substrate conditions, surface preparation, roof membrane application, sheet flashings, protection, and drainage components, and to furnish reports to Architect.
- B. Owner may engage a qualified testing agency to perform the following tests:
 - 1. Flood Testing: Flood test each roofing area for leaks, according to recommendations in ASTM D5957, after completing roofing and flashing. Install temporary containment assemblies, plug or dam drains, and flood with potable water.
 - a. Perform tests before overlying construction is placed.
 - b. Flood to an average depth of 2-1/2 inches with a minimum depth of 1 inch and not exceeding a depth of 4 inches. Maintain 2 inches of clearance from top of base flashing.
 - c. Flood each area for 24 hours.
 - d. After flood testing, repair leaks, repeat flood tests, and make further repairs until roofing and flashing installations are watertight.
 - 1) Cost of retesting is Contractor's responsibility.
 - e. Testing agency shall prepare survey report indicating locations initial leaks, if any, and final survey report.
 - 2. Infrared Thermography: Testing agency shall survey entire roof area using infrared color thermography according to ASTM C1153.

- a. Perform tests before overlying construction is placed.
 - b. After infrared scan, locate specific areas of leaks by electrical capacitance/impedance testing or nuclear hydrogen detection tests.
 - c. After testing, repair leaks, repeat tests, and make further repairs until roofing and flashing installations are watertight.
 - 1) Cost of retesting is Contractor's responsibility.
 - d. Testing agency shall prepare survey report of initial scan indicating locations of entrapped moisture, if any.
- C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion, in presence of Architect, and to prepare inspection report.
- D. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.10 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing system, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.11 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS _____ of _____, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
 - 1. Owner: State of Connecticut.
 - 2. Address: 450 Columbus Boulevard, Hartford, CT.
 - 3. Building Name/Type: CT DEEP, West District Headquarters.
 - 4. Address: 20654 Thomaston Road, Watertown, CT .
 - 5. Area of Work: EPDM Roof, North Side.
 - 6. Acceptance Date: _____.
 - 7. Warranty Period: 20-Years.

8. Expiration Date: _____.

- B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
- C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period Roofing Installer will, at Roofing Installer's own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
- D. This Warranty is made subject to the following terms and conditions:
1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
 - a. lightning;
 - b. peak gust wind speed exceeding 93 mph;
 - c. fire;
 - d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
 - e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
 - f. vapor condensation on bottom of roofing; and
 - g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
 2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
 3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
 4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
 5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.

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6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
 7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, _____.

1. Authorized Signature: _____.
2. Name: _____.
3. Title: _____.

END OF SECTION 075323

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Formed low-slope roof sheet metal fabrications.
2. Formed flashing and counterflashing.

B. Related Requirements:

1. Section 017419 - Construction and Demolition Waste Management and Disposal
2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
4. Section 044313 "Anchored Stone Masonry Veneer for installation of sheet metal through-wall flashing and trim integral with masonry.
5. Section 055000 "Metal Fabrications" for metal downspout boots.
6. Section 073116 "Metal Shingle Siding" for sheet metal flashing and trim integral with metal wall panels.
7. Section 074113 "Standing Seam Metal Roof Panels" for sheet metal flashing and trim integral with metal roof panels and for roof drainage assemblies.
8. Section 077100 "Roof Specialties" for manufactured copings, roof-edge specialties, roof-edge drainage systems, reglets, and counterflashings.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their

Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 COORDINATION

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
 - 3. Review requirements for insurance and certificates if applicable.
 - 4. Review sheet metal flashing observation and repair procedures after flashing installation.

1.6 ACTION SUBMITTALS

- A. Product Data: For each of the following
 - 1. Sheet Metal
 - 2. Underlayment materials.
 - 3. Elastomeric sealant.
 - 4. Butyl sealant.
 - 5. Epoxy seam sealer.
- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Shop Drawings: For sheet metal flashing and trim.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled Work.
 - 3. Include identification of material, thickness, weight, and finish for each item and location in Project.

4. Include details for forming, including profiles, shapes, seams, and dimensions.
 5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
 6. Include details of termination points and assemblies.
 7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
 8. Include details of roof-penetration flashing.
 9. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, flashings, and counterflashings.
 10. Include details of special conditions.
 11. Include details of connections to adjoining work.
 12. Detail formed flashing and trim at scale of not less than 1-1/2 inches per 12 inches.
- D. Samples: For each exposed product and for each color and texture specified, 12 inches long by actual width.
- E. Samples for Initial Selection: For each type of sheet metal and accessory indicated with factory-applied finishes.
- F. Samples for Verification: For each type of exposed finish.
1. Sheet Metal Flashing: 12 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
 2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches long and in required profile. Include fasteners and other exposed accessories.
 3. Unit-Type Accessories and Miscellaneous Materials: Full-size Sample.
 4. Anodized Aluminum Samples: Samples to show full range to be expected for each color required.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.
- B. Product Certificates: For each type of coping and roof edge flashing that is ANSI/SPRI/FM 4435 and FM Approvals approved.
- C. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- D. Evaluation Reports: For copings and roof edge flashing, from ICC-ES showing compliance with ANSI/SPRI/FM 4435/ES-1.
- E. Sample Warranty: For special warranty.

1.8 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.
- B. Special warranty.

1.9 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
 - 1. For copings and roof edge flashings that are ANSI/SPRI/FM 4435/ES-1 tested and FM Approvals approved, shop shall be listed as able to fabricate required details as tested and approved.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 - 1. Build mockup of typical flashings, approximately 10 feet long, including supporting construction cleats, seams, attachments, underlayment, and accessories.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Owner specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.
 - 1. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
 - 2. Protect stored sheet metal flashing and trim from contact with water.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.11 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. Sheet metal flashing and trim assemblies, including cleats, anchors, and fasteners, shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. FM Approvals Listing: Manufacture and install roof edge flashings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-75. Identify materials with name of fabricator and design approved by FM Approvals.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.3 SHEET METALS

- A. Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

- B. Aluminum Sheet: ASTM B209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.
1. Recycled content Postconsumer recycled content plus one-half of preconsumer recycled content not less than 90 percent.
 2. Exposed Coil-Coated Finish:
 - a. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 3. Color: As selected by Architect from manufacturer's full range.
 4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.
- C. Stainless Steel Sheet: ASTM A240/A240M, Type 304, dead soft, fully annealed; with smooth, flat surface.
1. Recycled content Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent
 2. Finish: ASTM A480/A480M, No. 2D (dull, cold rolled)
 - a. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- D. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet in accordance with ASTM A653/A653M, G90 coating designation or aluminum-zinc alloy-coated steel sheet in accordance with ASTM A792/A792M, Class AZ50 coating designation, Grade 40; prepainted by coil-coating process to comply with ASTM A755/A755M.
1. Recycled content Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent
 2. Surface: Smooth, flat.
 3. Exposed Coil-Coated Finish:
 - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 4. Color: As selected by Architect from manufacturer's full range.
 5. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

2.4 UNDERLAYMENT MATERIALS

- A. Felt: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felt; nonperforated.
- B. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. minimum.

2.5 MISCELLANEOUS MATERIALS

- A. Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - b. Blind Fasteners: High-strength aluminum or stainless steel rivets suitable for metal being fastened.
 - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
 - 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
 - 3. Fasteners for Stainless Steel Sheet: Series 300 stainless steel.
 - 4. Fasteners for Zinc-Coated (Galvanized) or Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel in accordance with
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- D. Elastomeric Sealant: ASTM C920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- F. Bituminous Coating: Cold-applied asphalt emulsion in accordance with ASTM D1187/D1187M.
- G. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required for application.

2.6 FABRICATION, GENERAL

- A. Custom fabricate sheet metal flashing and trim to comply with details indicated and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required.
1. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 2. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 3. Verify shapes and dimensions of surfaces to be covered and obtain field measurements for accurate fit before shop fabrication.
 4. Form sheet metal flashing and trim to fit substrates without excessive oil-canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 5. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances:
1. Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
 2. Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified.
- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
 2. Use lapped expansion joints only where indicated on Drawings.
- D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal in accordance with cited sheet metal standard to provide for proper installation of elastomeric sealant.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard and by FM Global Property Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.
- G. Seams:
1. Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 2. Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

- H. Do not use graphite pencils to mark metal surfaces.

2.7 ROOF-DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters:

1. Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required.
2. Fabricate in minimum 96-inch-long sections.
3. Furnish flat-stock gutter brackets and flat-stock gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard, but with thickness not less than twice the gutter thickness.
4. Fabricate expansion joints, expansion-joint covers, gutter bead reinforcing bars, and gutter accessories from same metal as gutters.
5. Gutter Profile: Style B in accordance with SMACNA Architectural Sheet Metal Manual.
6. Expansion Joints: Butt type with cover plate.
7. Accessories: Wire-ball downspout strainer.
8. Fabricate from the following materials:
 - a. Aluminum-Zinc Alloy-Coated Steel: Min. 0.028 inch thick.

B. Downspouts: Fabricate round downspouts to dimensions indicated on Drawings, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchor. Shop fabricate elbows.

1. Hanger Style: Min. 1/16" x 1" strap hangers .
2. Fabricate from the following materials:
 - a. Aluminum-Zinc Alloy-Coated Steel

C. Parapet Scuppers: Fabricate scuppers to dimensions required, with closure flange trim to exterior, 4-inch-wide wall flanges to interior, and base extending 4 inches beyond cant or tapered strip into field of roof. Fabricate from the following materials:

1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

D. Conductor Heads: Fabricate conductor heads with flanged back and stiffened top edge and of dimensions and shape required, complete with outlet tubes, exterior flange trim and built-in overflows. Fabricate from the following materials:

1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

2.8 EPDM ROOF SHEET METAL FABRICATIONS

A. Roof Edge Flashing (Gravel Stop): Refer to Section 077100 "Roof Specialties" for pre-fabricated roof edge.

- B. Base Flashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:
 - 1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.
- C. Counterflashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:
 - 1. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.
- D. Flashing Receivers: Fabricate from the following materials:
 - 1. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

2.9 STANDING SEAM METAL ROOF SHEET METAL FABRICATIONS

- A. Apron, Step, Cricket, and Backer Flashing: Fabricate from the following materials:
 - 1. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.
- B. Drip Edges: Fabricate from the following materials:
 - 1. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.
- C. Eave, Rake, Ridge and Hip Flashing: Fabricate from the following materials:
 - 1. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.
- D. Counterflashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:
 - 1. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.
- E. Flashing Receivers: Fabricate from the following materials:
 - 1. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.
- F. Roof-Penetration Flashing: Fabricate from the following materials:
 - 1. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

2.10 WALL SHEET METAL FABRICATIONS

- A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch-long, but not exceeding 12-foot-long, sections, under copings, and at shelf angles. Fabricate from the following materials:
 - 1. Stainless Steel: 0.0156 inch thick.

2.11 MISCELLANEOUS SHEET METAL FABRICATIONS

- A. Equipment Support Flashing: Fabricate from the following materials:
 - 1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
 - 1. Verify compliance with requirements for installation tolerances of substrates.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 - 3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF UNDERLAYMENT

- A. Felt Underlayment: Install felt underlayment, wrinkle free, using adhesive to minimize use of mechanical fasteners under sheet metal flashing and trim.
 - 1. Install in shingle fashion to shed water.
 - 2. Lap joints not less than 2 inches.
- B. Install slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.
 - 1. Install in shingle fashion to shed water.
 - 2. Lapp joints not less than 4 inches.

3.3 INSTALLATION, GENERAL

- A. Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.
 - 1. Install fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 2. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of sealant.

3. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement.
 4. Install sheet metal flashing and trim to fit substrates and to result in watertight performance.
 5. Install continuous cleats with fasteners spaced not more than 12 inches o.c.
 6. Space individual cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
 7. Install exposed sheet metal flashing and trim with limited oil-canning, and free of buckling and tool marks.
 8. Do not field cut sheet metal flashing and trim by torch.
 9. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
1. Coat concealed side of sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim.
1. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
 2. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
 3. Use lapped expansion joints only where indicated on Drawings.
- D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws, but not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction.
1. Use sealant-filled joints unless otherwise indicated.
 - a. Embed hooked flanges of joint members not less than 1 inch into sealant.
 - b. Form joints to completely conceal sealant.
 - c. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way.
 - d. Adjust setting proportionately for installation at higher ambient temperatures.
 - 1) Do not install sealant-type joints at temperatures below 40 deg F.

2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

G. Rivets: Rivet joints where necessary for strength.

3.4 INSTALLATION OF ROOF-DRAINAGE SYSTEM

A. Install sheet metal roof-drainage items to produce complete roof-drainage system in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

B. Hanging Gutters:

1. Join sections with joints sealed with sealant.
2. Provide for thermal expansion.
3. Attach gutters at eave or fascia to firmly anchor them in position.
4. Provide end closures and seal watertight with sealant.
5. Slope to downspouts.
6. Fasten gutter spacers to front and back of gutter.
7. Anchor gutter with gutter brackets and straps spaced not more than 24 inches apart to roof deck unless otherwise indicated, and loosely lock to front gutter bead.
8. Install gutter with expansion joints at locations indicated on Drawings, but not exceeding, 50 feet apart. Install expansion-joint caps.

C. Downspouts:

1. Join sections with 1-1/2-inch telescoping joints.
2. Provide hangers with fasteners designed to hold downspouts securely to walls.
3. Locate hangers at top and bottom and at approximately 60 inches o.c.
4. Provide elbows at base of downspout to direct water away from building.
5. Connect downspouts to underground drainage system at metal downspout boot.

D. Scuppers:

1. Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.
2. Anchor scupper closure trim flange to exterior wall and seal with elastomeric sealant to scupper.
3. Loosely lock front edge of scupper with conductor head.
4. Seal with elastomeric sealant exterior wall scupper flanges into back of conductor head.

E. Conductor Heads: Anchor securely to wall, with elevation of conductor head rim at minimum of 1 inch below scupper discharge.

3.5 INSTALLATION OF ROOF FLASHINGS

- A. Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard.
 - 1. Provide concealed fasteners where possible, and set units true to line, levels, and slopes.
 - 2. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Roof Edge Flashing:
 - 1. Install roof edge flashings in accordance with ANSI/SPRI/FM 4435/ES-1.
 - 2. Anchor to resist uplift and outward forces in accordance with recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.
- C. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless steel draw band and tighten.
- D. Counterflashing: Coordinate installation of counterflashing with installation of base flashing.
 - 1. Insert counterflashing in reglets or receivers and fit tightly to base flashing.
 - 2. Extend counterflashing 4 inches over base flashing.
 - 3. Lap counterflashing joints minimum of 4 inches.
 - 4. Secure in waterproof manner by means of interlocking folded seam or blind rivets and sealant unless otherwise indicated.
- E. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.6 INSTALLATION OF WALL FLASHINGS

- A. Install sheet metal wall flashing to intercept and exclude penetrating moisture in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Opening Flashings in SIPs Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

3.7 INSTALLATION OF MISCELLANEOUS FLASHING

- A. Equipment Support Flashing:
 - 1. Coordinate installation of equipment support flashing with installation of roofing and equipment.

2. Weld or seal flashing with elastomeric sealant to equipment support member.

3.8 INSTALLATION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.9 CLEANING

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.

3.10 PROTECTION

- A. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended in writing by sheet metal flashing and trim manufacturer.
- C. Maintain sheet metal flashing and trim in clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.

END OF SECTION 076200

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SECTION 077100 - ROOF SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Roof-edge specialties.

- B. Related Requirements:

- 1. Section 017419 - Construction and Demolition Waste Management and Disposal
 - 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
 - 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
 - 4. Section 055000 "Metal Fabrications" for downspout boots.
 - 5. Section 074113 "Standing-Seam Metal Roof Panels" for roof-edge components provided by metal-roof-panel manufacturer.
 - 6. Section 075323 "EPDM Roofing" for roofing system compatible with the roof-edge specialties specified in this section.
 - 7. Section 076200 "Sheet Metal Flashing and Trim" for custom- and site-fabricated sheet metal flashing and trim.
 - 8. Section 077253 "Snow Guards" for manufactured snow guard devices.
 - 9. Section 079200 "Joint Sealants" for field-applied sealants between roof specialties and adjacent materials.

- C. Preinstallation Conference: Conduct conference at Project site.

- 1. Meet with Owner, Architect, Owner's insurer if applicable, roofing-system testing and inspecting agency representative, roofing Installer, roofing-system manufacturer's representative, Installer, structural-support Installer, and installers whose work interfaces with or affects roof specialties, including installers of roofing materials and accessories.
 - 2. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
 - 3. Review special roof details, roof drainage, and condition of other construction that will affect roof specialties.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Shop Drawings: For roof specialties.
 - 1. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work.
 - 2. Include details for expansion and contraction; locations of expansion joints, including direction of expansion and contraction.
 - 3. Indicate profile and pattern of seams and layout of fasteners, cleats, clips, and other attachments.
 - 4. Detail termination points and assemblies, including fixed points.
 - 5. Include details of special conditions.
- D. Samples: For each type of roof specialty and for each color and texture specified.
- E. Samples for Initial Selection: For each type of roof specialty indicated with factory-applied color finishes.
- F. Samples for Verification:
 - 1. Include Samples of each type of roof specialty to verify finish and color selection, in manufacturer's standard sizes.

2. Include roof-edge specialties made from 12-inch lengths of full-size components in specified material, and including fasteners, cover joints, accessories, and attachments.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Product Certificates: For each type of roof specialty.
- C. Product Test Reports: For roof-edge flashings, for tests performed by a qualified testing agency.
- D. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing specialties to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are FM Approvals listed for specified class.
- B. Source Limitations: Obtain roof specialties approved by manufacturer providing roofing-system warranty specified in Section 075323 "EPDM Roofing".
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and set quality standards for fabrication and installation.
 1. Build mockup of typical roof edge, approximately 10 feet long, including supporting construction, seams, attachments, underlayment, and accessories.
 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Do not store roof specialties in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.
- B. Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof-specialty installation.

1.9 FIELD CONDITIONS

- A. Field Measurements: Verify profiles and tolerances of roof-specialty substrates by field measurements before fabrication, and indicate measurements on Shop Drawings.
- B. Coordination: Coordinate roof specialties with flashing, trim, and construction of parapets, roof deck, roof and wall panels, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.10 WARRANTY

- A. Roofing-System Warranty: Roof specialties are included in warranty provisions in Section 075323 "EPDM Roofing".
- B. Special Warranty on Painted Finishes: Manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Delta E units when tested according to ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof specialties shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 90 percent.
- C. FM Approvals' Listing: Manufacture and install roof-edge specialties that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-75. Identify materials with FM Approvals' markings.

- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.3 ROOF-EDGE SPECIALTIES

- A. One-Piece Gravel Stops: Manufactured, one-piece, metal gravel stop in section lengths not exceeding 12 feet, with a horizontal flange and vertical leg, fascia terminating in a drip edge, and concealed splice plates of same material, finish, and shape as gravel stop. Provide matching corner units.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Berridge Manufacturing Company.
 - b. Cheney Flashing Company.
 - c. Drexel Metals.
 2. Metallic-Coated Steel Sheet Gravel Stops: Zinc-coated (galvanized) steel, nominal 0.028-inch thickness or as required to meet performance requirements.
 - a. Surface: Smooth, flat finish.
 - b. Finish: Two-coat fluoropolymer.
 - c. Color: As selected by Architect from manufacturer's full range.
 3. Corners: Factory mitered and continuously welded or mechanically clinched and sealed watertight.
 4. Accessories: Fascia extenders with continuous hold-down cleats.

2.4 MATERIALS

- A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, G90 coating designation.
- B. Aluminum Sheet: ASTM B209, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.
- C. Aluminum Extrusions: ASTM B221, alloy and temper recommended by manufacturer for type of use and finish indicated, finished as follows:
- D. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304.
- E. Copper Sheet: ASTM B370, cold-rolled copper sheet, H00 or H01 temper.

2.5 UNDERLAYMENT MATERIALS

- A. Felt: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
- B. Slip Sheet: Rosin-sized building paper, 3-lb/100 sq. ft. minimum.

2.6 MISCELLANEOUS MATERIALS

- A. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:
 - 1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
 - 2. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A153/A153M or ASTM F2329.
- B. Elastomeric Sealant: ASTM C920, elastomeric polyurethane polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.
- C. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

2.7 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Coil-Coated Galvanized-Steel Sheet Finishes:
 - 1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with ASTM A755/A755M and coating and resin manufacturers' written instructions.
 - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Examine walls, roof edges, and parapets for suitable conditions for roof specialties.
- C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage where applicable, and securely anchored.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF UNDERLAYMENT

- A. Felt Underlayment: Install with adhesive for temporary anchorage to minimize use of mechanical fasteners under roof specialties. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.
- B. Slip Sheet: Install with tape or adhesive for temporary anchorage to minimize use of mechanical fasteners under roof specialties. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.

3.3 INSTALLATION, GENERAL

- A. Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, underlayments, sealants, and other miscellaneous items as required to complete roof-specialty systems.
 - 1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
 - 2. Provide uniform, neat seams with minimum exposure of solder and sealant.
 - 3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
 - 4. Torch cutting of roof specialties is not permitted.
 - 5. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
 - 1. Coat concealed side of roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.

2. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.
- C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.
1. Space movement joints at a maximum of 12 feet with no joints within 18 inches of corners or intersections unless otherwise indicated on Drawings.
 2. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.
- D. Fastener Sizes: Use fasteners of sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F.

3.4 INSTALLATION OF ROOF-EDGE SPECIALITIES

- A. Install cleats, cants, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor roof edgings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.

3.5 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess sealants.
- C. Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.
- D. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077100

SECTION 077253 - SNOW GUARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Rail-type, seam-mounted snow guards.

- B. Related Requirements:

- 1. Section 017419 - Construction and Demolition Waste Management and Disposal
 - 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
 - 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
 - 4. Section 074113 "Standing-Seam Metal Roof Panels" for roof-edge components provided by metal-roof-panel manufacturer.
 - 5. Section 133419 "Metal Building Systems" for snow guards at Garage Roof.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product, include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

- B. Sustainable Design Submittals:

- 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.

- C. Shop Drawings: Include roof plans showing layouts and attachment details of snow guards.

- 1. Include details of rail-type snow guards.

D. Samples:

1. Rail-Type Snow Guards: Bracket, 12-inch-long rail, and installation hardware.
 - a. For units with factory-applied finishes, submit manufacturer's standard color selections.

A. Engineered Submittal: For snow guards, including analysis verifying compliance with requirements. Submittal shall include details of snow-guard assembly and fabrication, as well as mounting to substrates.

1. Include calculation of number and location of snow guards.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For professional engineer's experience with providing delegated design engineering services of the kind indicated, including documentation that the engineer is licensed in the State of Connecticut.

B. Product Test Reports: For each type of snow guard, for tests performed by a qualified testing agency, indicating load at failure of attachment to roof system identical to roof system used on this Project.

1.5 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit adhesive-mounted snow guards to be installed, and adhesive cured, according to adhesive manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design snow guards, including attachment to roofing material and roof deck, as applicable for attachment method, based on the following:

1. Roof snow load.
2. Snow drifting
3. Roof slope.
4. Roof type.
5. Roof dimensions.
6. Roofing substrate type and thickness.
7. Impact of PV Panels and attachment.
8. Snow guard type.

-
9. Snow guard fastening method and strength.
 10. Snow guard spacing.
 11. Coefficient of Friction Between Snow and Roof Surface: 0.
 12. Factor of Safety: 2.
- B. Performance Requirements: Provide snow guards that withstand exposure to weather and resist thermally induced movement without failure, rattling, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- C. Structural Performance: Snow guards shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.
1. Snow Loads: As indicated on Drawings.

2.2 RAIL-TYPE SNOW GUARDS

- A. Rail-Type, Seam-Mounted Snow Guards:
1. Description: Snow guard rails fabricated from metal pipes, bars, or extrusions, anchored to brackets and equipped with minimum two rails.
 2. Brackets and Baseplate: ASTM A240, Type 304 stainless steel; mill.
 3. Bars: ASTM A240, Type 304 stainless steel; mill finish.
 - a. Profile: Round.
 4. Seam clamps: ASTM B221 aluminum extrusion or ASTM B85/B85M aluminum casting with stainless steel set screws incorporating round nonpenetrating point; designed for use with applicable roofing system to which clamp is attached. Ensure isolation of steel and aluminum.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, snow guard attachment, and other conditions affecting performance of the Work.
1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean and prepare substrates for bonding snow guards.
- B. Prime substrates according to snow guard manufacturer's written instructions.

3.3 INSTALLATION

- A. Install snow guards according to manufacturer's written instructions.
 - 1. Space rows as required by Delegated Design and indicated on approved Shop Drawings.
- B. Attachment for Standing-Seam Metal Roofing:
 - 1. Do not use fasteners that will penetrate metal roofing or fastening methods that void metal roofing finish warranty.
 - 2. Rail-Type, Seam-Mounted Snow Guards:
 - a. Install brackets to vertical ribs in straight rows.
 - b. Secure with stainless steel set screws, incorporating round nonpenetrating point, on same side of standing seam.
 - c. Torque set screw according to manufacturer's instructions.
 - d. Install cross members to brackets.

END OF SECTION 077253

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Penetration firestopping systems for the following applications:
 - a. Penetrations in fire-resistance-rated walls.
 - b. Penetrations in horizontal assemblies.

- B. Related Requirements:

- 1. Section 017419 - Construction and Demolition Waste Management and Disposal
- 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
- 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
- 4. Section 078443 "Joint Firestopping" for joints in or between fire-resistance-rated construction, at exterior curtain-wall/floor intersections, and in smoke barriers.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.
 - 1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.

1.6 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Approval according to FM Approval 4991, "Approval Standard for Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

- B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.9 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
 - 1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.
 - 1) UL in its "Fire Resistance Directory."
 - 2) FM Approval in its "Approval Guide."

2.3 PENETRATION FIRESTOPPING SYSTEMS

- A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. 3M Fire Protection Products.
 - b. Hilti, Inc.
 - c. Specified Technologies, Inc.
 - d. Tremco, Inc.
- B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
 2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
 3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.
- D. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E84.
1. Verify sealant has a VOC content of 250 g/L or less.
- E. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
1. Permanent forming/damming/backing materials.
 2. Substrate primers.
 3. Collars.
 4. Steel sleeves.
- 2.4 FILL MATERIALS
- A. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- B. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- C. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.

- D. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.
- E. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- F. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- G. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- H. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

2.5 MIXING

- A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.

- B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

- A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- C. Install fill materials by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes.
 - 1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet from end of wall and at intervals not exceeding 30 feet. Locations to be identified by Architect in the field.
- B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
 - 1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Designation of applicable testing and inspecting agency.

4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E2174.
- B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.
- C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

3.7 PENETRATION FIRESTOPPING SYSTEM

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.
- B. Where FM Approval-approved systems are indicated, they refer to design numbers listed in FM Approval's "Approval Guide" under "Wall and Floor Penetration Fire Stops."
- C. Penetration Firestopping Systems are as detailed.

END OF SECTION 078413

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SECTION 078443 - JOINT FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Joints in or between fire-resistance-rated constructions.

- B. Related Requirements:

- 1. Section 017419 - Construction and Demolition Waste Management and Disposal
 - 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
 - 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
 - 4. Section 078413 "Penetration Firestopping" for penetrations in fire-resistance-rated walls, horizontal assemblies, and smoke barriers and for wall identification.
 - 5. Section 092216 "Non-Structural Metal Framing" for firestop tracks for metal-framed partition heads.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.

C. Product Schedule: For each joint firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing agency.

1. Engineering Judgments: Where Project conditions require modification to a qualified testing agency's illustration for a particular joint firestopping system condition, submit illustration, with modifications marked, approved by joint firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.
2. Engineering judgements shall be submitted to the Office of the State Building Inspector for approval.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each joint firestopping system, for tests performed by a qualified testing agency.

1.6 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FM Approvals according to FM Approvals 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with UL's "Qualified Firestop Contractor Program Requirements."

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not install joint firestopping systems when ambient or substrate temperatures are outside limits permitted by joint firestopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Install and cure joint firestopping systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.9 COORDINATION

- A. Coordinate construction of joints to ensure that joint firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of joints to accommodate joint firestopping systems.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
 - 1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Test per testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Joint firestopping systems shall bear classification marking of a qualified testing agency.
 - 1) UL in its "Fire Resistance Directory."
 - 2) FM Approval in its "Approval Guide."

2.3 JOINT FIRESTOPPING SYSTEMS

- A. Joint Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.
- B. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E1966 or UL 2079.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. 3M Fire Protection Products.
 - b. Hilti, Inc.

- c. Specified Technologies, Inc.
 - d. Tremco, Inc.
2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the wall, floor, or roof in or between which it is installed.
- C. Exposed Joint Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E84.
- 1. Verify sealant has a VOC content of 250 g/L or less.
- D. Accessories: Provide components of joint firestopping systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain ratings required. Use only components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Before installing joint firestopping systems, clean joints immediately to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
 - 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of elastomeric fill materials or compromise fire-resistive rating.
 - 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with elastomeric fill materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by joint firestopping system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

- A. General: Install joint firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming materials and other accessories of types required to support elastomeric fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.
- C. Install elastomeric fill materials for joint firestopping systems by proven techniques to produce the following results:
 - 1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
 - 2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.
 - 3. For elastomeric fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
 - 1. The words "Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Designation of applicable testing agency.
 - 4. Date of installation.
 - 5. Manufacturer's name.
 - 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E2393.
- B. Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.

- C. Proceed with enclosing joint firestopping systems with other construction only after inspection and approval of the Office of the State Building Inspector, reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess elastomeric fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by joint firestopping system manufacturers and that do not damage materials in which joints occur.
- B. Provide final protection and maintain conditions during and after installation that ensure joint firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated joint firestopping systems immediately and install new materials to produce joint firestopping systems complying with specified requirements.

3.7 JOINT FIRESTOPPING SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory".
- B. Provide joints as detailed on Drawings.

END OF SECTION 078443

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Polysulfide joint sealants.
- 2. Latex joint sealants.

- B. Related Requirements:

- 1. Section 017419 - Construction and Demolition Waste Management and Disposal
- 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
- 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
- 4. Section 078443 "Joint Firestopping" for joints in or between fire-resistance-rated construction, at exterior curtain-wall/floor intersections, and in smoke barriers.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- D. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- E. Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Product Test Reports: For each kind of joint sealant, for tests performed by manufacturer and witnessed by a qualified testing agency.
- C. Preconstruction Laboratory Test Schedule: Include the following information for each joint sealant and substrate material to be tested:
 - 1. Joint-sealant location and designation.
 - 2. Manufacturer and product name.
 - 3. Type of substrate material.
 - 4. Proposed test.
 - 5. Number of samples required.
- D. Preconstruction Laboratory Test Reports: From sealant manufacturer, indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.

- E. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.
- F. Field-Adhesion-Test Reports: For each sealant application tested.
- G. Sample Warranties: For special warranties.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B. Product Testing: Test joint sealants using a qualified testing agency.
 - 1. Testing Agency Qualifications: Qualified according to ASTM C1021 to conduct the testing indicated.
- C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.8 PRECONSTRUCTION TESTING

- A. Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
 - 1. Adhesion Testing: Use ASTM C794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - 2. Compatibility Testing: Use ASTM C1087 to determine sealant compatibility when in contact with glazing and gasket materials.
 - 3. Submit manufacturer's recommended number of pieces of each type of material, including joint substrates, joint-sealant backings, and miscellaneous materials.
 - 4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 - 5. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
 - 6. Testing will not be required if joint-sealant manufacturers submit data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.
- B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:
 - 1. Locate test joints where directed by Architect.
 - 2. Conduct field tests for each kind of sealant and joint substrate.

3. Notify Architect seven days in advance of dates and times when test joints will be erected.
4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
 - a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.
 - 1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.9 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 2. When joint substrates are wet.
 3. Where joint widths are less than or more than those allowed by joint-sealant manufacturer for applications indicated.
 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.10 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 1. Warranty Period: Five years from date of Substantial Completion.

- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 - 1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 - 2. Disintegration of joint substrates from causes exceeding design specifications.
 - 3. Mechanical damage caused by individuals, tools, or other outside agents.
 - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. VOC Content: Verify sealants and sealant primers comply with the following:
 - 1. Architectural sealants have a VOC content of 250 g/L or less.
 - 2. Sealants and sealant primers for nonporous substrates have a VOC content of 250 g/L or less.
 - 3. Sealants and sealant primers for porous substrates have a VOC content of 775 g/L or less.
- C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 POLYSULFIDE JOINT SEALANTS

- A. Polysulfide, S, NS, 25, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, polysulfide joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. W.R. Meadows, Inc.
 - b. Tremco, Inc.
 - c. Pecora Corporation
- B. Polysulfide, M, NS, 25, T, NT: Multicomponent, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, polysulfide joint sealant; ASTM C920, Type M, Grade NS, Class 25, Use NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. W.R. Meadows, Inc.
 - b. Tremco, Inc.
 - c. Pecora Corporation

- C. Polysulfide, M, P, 25, T, NT: Multicomponent, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, polysulfide joint sealant; ASTM C920, Type M, Grade P, Class 25, Uses T and NT.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. W.R. Meadows, Inc.
 - b. Tremco, Inc.
 - c. Pecora Corporation

2.3 LATEX JOINT SEALANTS

- A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Pecora Corporation.
 - b. Sherwin-Williams Company (The).
 - c. Tremco Incorporated.

2.4 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Adfast.
 - b. Alcot Plastics Ltd.
 - c. BASF Corporation.
 - d. Construction Foam Products; a division of Nomaco, Inc.

- B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.

- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 1. Do not leave gaps between ends of sealant backings.
 2. Do not stretch, twist, puncture, or tear sealant backings.
 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile per Figure 8A in ASTM C1193 unless otherwise indicated.
 - 4. Provide flush joint profile at horizontal surfaces according to Figure 8B in ASTM C1193.

3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
 - 1. Extent of Testing: Test completed and cured sealant joints as follows:
 - a. Perform 3 tests for the first 100 feet of joint length for each kind of sealant and joint substrate.
 - b. Perform one test for each 200 feet of joint length thereafter or one test per each floor per elevation.
 - 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.
 - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 - 3. Inspect tested joints and report on the following:
 - a. Whether sealants filled joint cavities and are free of voids.
 - b. Whether sealant dimensions and configurations comply with specified requirements.
 - c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079200

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:

- 1. Interior standard steel doors and frames.

- B. Related Requirements:

- 1. Section 017419 - Construction and Demolition Waste Management and Disposal
- 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
- 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
- 4. Section 081416 "Flush Wood Doors" for wood doors installed in metal frames.
- 5. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.
- 6. Section 088000 "Glazing" for glass installed in metal doors and frames.
- 7. Section 133419 "Metal Building Systems" for doors installed as part of manufactured building.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or ANSI/SDI A250.8.

1.5 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.
- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Shop Drawings: Include the following:
 - 1. Elevations of each door type.
 - 2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
 - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 4. Locations of reinforcement and preparations for hardware.
 - 5. Details of each different wall opening condition.
 - 6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
 - 7. Details of anchorages, joints, field splices, and connections.
 - 8. Details of accessories.
 - 9. Details of moldings, removable stops, and glazing.
- D. Samples for Initial Selection: For hollow-metal doors and frames with factory-applied color finishes.
- E. Samples for Verification:

1. Finishes: For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches.
 2. Fabrication: Prepare Samples approximately 12 by 12 inches to demonstrate compliance with requirements for quality of materials and construction:
 - a. Doors: Show vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.
 - b. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow-metal panels and glazing if applicable.
- F. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For door inspector.
1. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1.
- B. Product Test Reports: For each type of fire-rated hollow-metal door and frame assembly for tests performed by a qualified testing agency indicating compliance with performance requirements.
- C. Field quality control reports.

1.8 CLOSEOUT SUBMITTALS

- A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.9 QUALITY ASSURANCE

- A. Fire-Rated Door Inspector Qualifications: Inspector for field quality control inspections of fire-rated door assemblies shall meet the qualifications set forth in NFPA 80, section 5.2.3.1.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
1. Provide additional protection to prevent damage to factory-finished units.

- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Ceco Door; ASSA ABLOY.
 - 2. Curries Company; ASSA ABLOY.
 - 3. Philipp Manufacturing Co (The).
 - 4. Republic Doors and Frames.
 - 5. Steelcraft; an Allegion brand.

2.3 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated on Drawings, based on testing at positive pressure according to NFPA 252 or UL 10C.

2.4 INTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B. At locations indicated in the Door and Frame Schedule as 'HM'.
 - 1. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches.

- c. Face: Metallic-coated steel sheet, minimum thickness of 0.042 inch.
- d. Edge Construction: Model 1, Full Flush or Model 2, Seamless.
- e. Edge Bevel: Provide manufacturer's standard beveled or square edges].
- f. Core: Manufacturer's standard.
- g. Fire-Rated Core: Manufacturer's standard vertical steel stiffener or laminated mineral board core for fire-rated doors.

2. Frames:

- a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch.
- b. Interior Window and Sidelite Frames: Fabricated from same thickness material as adjacent door frame.
- c. Construction: Full profile welded.

3. Exposed Finish: Prime

2.5 BORROWED LITES

- A. Fabricate of metallic-coated steel sheet, minimum thickness of 0.053 inch.
- B. Construction: Full profile welded.
- C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.
- D. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

2.6 HOLLOW-METAL PANELS

- A. Provide hollow-metal panels of same materials, construction, and finish as adjacent door assemblies.

2.7 FRAME ANCHORS

A. Jamb Anchors:

- 1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
- 2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.

- B. Floor Anchors: Provide fully concealed floor anchors for each jamb and mullion that extends to floor. Coordinate anchors with radiant slab heating piping to avoid damage to pipes.
- C. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.

2.8 MATERIALS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- C. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- D. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A153/A153M.
- F. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- G. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.
- H. Glazing: Comply with requirements in Section 088000 "Glazing."

2.9 FABRICATION

- A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
 - 1. Interior Window and Sidelite Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding, or by rigid mechanical anchors.

2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to ANSI/SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.
- D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
1. Provide stops and moldings flush with face of door, and with beveled stops unless otherwise indicated.
 2. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
 3. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
 4. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

2.10 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.

- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

- A. Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.
- B. Hollow-Metal Frames: Comply with ANSI/SDI A250.11.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
 - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - b. Install frames with removable stops located on secure side of opening.
 - 2. Fire-Rated Openings: Install frames according to NFPA 80.
 - 3. Floor Anchors: Secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 - 4. Solidly pack mineral-fiber insulation inside frames.
 - 5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
 - 6. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
 - 1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8.
 - 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 FIELD QUALITY CONTROL

- A. Inspection Agency: Office of the State Building Inspector and/or State Fire Marshal, or at the Owner's discretion another qualified inspector shall perform inspections and furnish reports to Architect.
- B. Inspections:
 - 1. Fire-Rated Door Inspections: Inspect each fire-rated door according to NFPA 80, Section 5.2.
- C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.
- E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80.

3.4 REPAIR

- A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- C. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081113

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SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Solid-core wood veneer-faced doors for transparent finish.
2. Factory finishing flush wood doors.
3. Factory fitting flush wood doors to frames and factory machining for hardware.

- B. Related Requirements:

1. Section 017419 - Construction and Demolition Waste Management and Disposal
2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
4. Section 064023 "Interior Architectural Woodwork" for wood paneling and wainscots.
5. Section 081113 "Hollow Metal Doors and Frames" for door frames to receive wood doors.
6. Section 087100 "Door Hardware" for hardware to be installed in doors.
7. Section 088000 "Glazing" for glass view panels in flush wood doors.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product, including the following:
1. Door core materials and construction.
 2. Door edge construction
 3. Door face type and characteristics.
 4. Door louvers.
 5. Door trim for openings.
 6. Door frame construction.
 7. Factory-machining criteria.
 8. Factory-finishing specifications.
- B. Sustainable Design Submittals:
1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
 2. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
 3. Chain-of-Custody Qualification Data: For manufacturer and vendor.
 4. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
- C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:
1. Door schedule indicating door location, type, size, fire protection rating, and swing.
 2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
 3. Details of frame for each frame type, including dimensions and profile.
 4. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
 5. Dimensions and locations of blocking for hardware attachment.
 6. Dimensions and locations of mortises and holes for hardware.
 7. Clearances and undercuts.
 8. Requirements for veneer matching.
 9. Doors to be factory finished and application requirements.
- D. Samples for Initial Selection: For factory-finished doors.
- E. Samples for Verification:
1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.
 2. Corner sections of doors, approximately 8 by 10 inches, with door faces and edges representing actual materials to be used.
 3. Frames for light openings, 6 inches long, for each material, type, and finish required.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For door inspector.
 - 1. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1.
- B. Field quality-control reports.
- C. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Special warranties.
- B. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.7 QUALITY ASSURANCE

- A. Certified Wood: Provide an invoice including vendor's chain-of-custody number, product cost, and entity being invoiced.
- B. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.
- C. Fire-Rated Door Inspector Qualifications: Inspector for field quality-control inspections of fire-rated door assemblies shall comply with qualifications set forth in NFPA 80.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in cardboard cartons, and wrap bundles of doors in plastic sheeting.
- C. Mark each door on top or bottom rail with opening number used on Shop Drawings.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of construction period.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Delamination of veneer.
 - b. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
 - c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
 - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 MANUFACTURERS

- A. Source Limitations: Obtain flush wood doors from single manufacturer.

2.3 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Wood Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated on Drawings, based on testing at positive pressure in accordance with UL 10C or NFPA 252.
 - 1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
 - 2. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

2.4 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with ANSI/WDMA I.S. 1A.
- B. Certified Wood: Certify wood doors as "FSC Pure"] in accordance with FSC STD-01-001 and FSC STD-40-004.
- C. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.5 SOLID-CORE FLUSH WOOD VENEER-FACED DOORS FOR TRANSPARENT FINISH

- A. Interior Doors:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Eggers Industries.
 - b. Lambton Doors.
 - c. Oshkosh Door Company.
 - d. VT Industries Inc.
 - 2. Performance Grade: ANSI/WDMA I.S. 1A Heavy Duty.
 - 3. Faces: Single-ply wood veneer not less than 1/50 inch thick.
 - a. Species:
 - 1) Doors at Upper Level to be Select White Maple
 - 2) Doors at Lower Level to be White Oak
 - b. Cut: Plain sliced (flat sliced).
 - c. Match between Veneer Leaves: Book match.
 - d. Assembly of Veneer Leaves on Door Faces: Center-balance match.
 - e. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
 - f. Room Match: Match door faces within each separate room or area of building. Corridor-door faces do not need to match where they are separated by 10 feet or more.
 - 4. Exposed Vertical and Top Edges: Same species as faces or a compatible species.
 - a. Fire-Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed vertical edges.
 - b. Fire-Rated Pairs of Doors: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.

- c. Mineral-Core Doors: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
 - 1) Screw-Holding Capability: 475 lbf in accordance with WDMA T.M. 10.
- 5. Core for Non-Fire-Rated Doors:
 - a. Manufacturer's option to provide one of the following:
 - 1) ANSI A208.1, Grade LD-1 particleboard.
 - a) Provide doors with glued-wood-stave or WDMA I.S. 10 structural-composite-lumber cores instead of particleboard cores for doors scheduled to receive exit devices in Section 087100 "Door Hardware."
 - 2) Glued wood stave.
 - 3) Agrifiber core.
 - b. WDMA I.S. 10 structural composite lumber.
 - 1) Screw Withdrawal, Door Face: 475 lbf.
 - 2) Screw Withdrawal, Vertical Door Edge: 475 lbf.
 - c. Either glued wood stave or WDMA I.S. 10 structural composite lumber.
- 6. Core for Fire-Rated Doors: As required to achieve fire-protection rating indicated on Drawings.
 - a. Blocking for Mineral-Core Doors: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated on Drawings as needed to eliminate through-bolting hardware.
- 7. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

2.6 LIGHT FRAMES

- A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.
 - 1. Wood Species: Same species as door faces.
 - 2. Profile: Manufacturer's standard shape.
 - 3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.
- B. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch-thick, cold-rolled steel sheet; factory primed for paint finish; and approved for use in doors of fire-protection rating indicated on Drawings.

2.7 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated.
 - 1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 - 2. Comply with NFPA 80 requirements for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied.
 - 1. Locate hardware to comply with DHI-WDHS-3.
 - 2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
 - 3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.
 - 4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.
 - 5. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- C. Openings: Factory cut and trim openings through doors.
 - 1. Light Openings: Trim openings with moldings of material and profile indicated.
 - 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."

2.8 FACTORY FINISHING

- A. Comply with referenced quality standard for factory finishing.
 - 1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - 2. Finish faces, all four edges, edges of cutouts, and mortises.
 - 3. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors.
- C. Transparent Finish:
 - 1. Finish ANSI/WDMA I.S. 1A TR-8 UV Cured Acrylated Polyester/Urethane
 - 2. Staining: As selected by Architect from manufacturer's full range.
 - 3. Effect: Open-grain finish at maple Doors. Semifilled finish, produced by applying an additional finish coat to partially fill the wood pores at Oak Doors.
 - 4. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
 - 1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Section 087100 "Door Hardware."
- B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
 - 1. Install fire-rated doors and frames in accordance with NFPA 80.
- C. Factory-Fitted Doors: Prepare doors for fitting in specified frames to ensure proper alignment of hardware and uniform clearance at each edge.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 FIELD QUALITY CONTROL

- A. Inspection Agency: Owner may engage a qualified inspector to perform inspections and to furnish reports to Architect.
- B. Inspections:
 - 1. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, Section 5.2.
- C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.
- E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80.

3.4 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

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SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes access doors and frames for walls and ceilings.
- B. Related Requirements:
 - 1. Section 017419 - Construction and Demolition Waste Management and Disposal
 - 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
 - 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, fire ratings, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Sustainable Design Submittals:

1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.

C. Product Schedule: For access doors and frames.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing and inspecting agency.

1. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, section 5.2.3.1.

1.6 CLOSEOUT SUBMITTALS

A. Record Documents: For fire-rated doors, list of applicable room name and number in which access door is located.

1.7 QUALITY ASSURANCE

A. Fire-Rated Door Inspector Qualifications: Inspector for field quality control inspections of fire-rated door assemblies shall meet the qualifications set forth in NFPA 80, section 5.2.3.1.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2–PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Access Doors and Frames: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, according to NFPA 252 or UL 10B.

2.3 ACCESS DOORS AND FRAMES

A. Flush Access Doors with Exposed Flanges:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Acudor Products, Inc.
 - b. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - c. Larsens Manufacturing Company.
 - d. Milcor; a division of Hart & Cooley, Inc.
 - e. Nystrom.
2. Description: Face of door flush with frame, with exposed flange and concealed hinge.
3. Locations: Wall and ceiling.
4. Door Size:
 - a. To access plumbing valve, trap primer, control, j-box. etc. , minimum 12" x 12" but not less than required for access, including tool space.
5. Uncoated Steel Sheet for Door: At dry areas. Nominal 0.060 inch, 16 gage factory primed.
6. Metallic-Coated Steel Sheet for Door: At Toilet Rooms, Shower/Locker Room and within 5-feet of plumbing fixtures. Nominal 0.064 inch, 16 gage, factory primed.
7. Frame Material: Same material, thickness, and finish as door.
8. Latch and Lock: Cam latch, screwdriver operated.

2.4 FIRE-RATED ACCESS DOORS AND FRAMES

A. Fire-Rated, Flush Access Doors with Exposed Flanges:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Acudor Products, Inc.
 - b. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - c. Larsens Manufacturing Company.
 - d. Milcor; a division of Hart & Cooley, Inc.
 - e. Nystrom.
2. Description: Door face flush with frame, with a core of mineral-fiber insulation enclosed in sheet metal; with exposed flange, self-closing door, and concealed hinge.
3. Locations: At vertical and horizontal shaftwall.
4. Door Size:
 - a. To access fire damper in duct, minimum 16" x 16" but not less than required for access to reset and test damper.
5. Fire-Resistance Rating: Not less than that of adjacent construction.
6. Temperature-Rise Rating: 450 deg F at the end of 30 minutes.
7. Uncoated Steel Sheet for Door: Nominal 0.036 inch, 20 gage, factory primed.
8. Frame Material: Same material, thickness, and finish as door.
9. Latch and Lock: Self-latching door hardware, operated by knurled-knob.

2.5 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A879/A879M, with cold-rolled steel sheet substrate complying with ASTM A1008/A1008M, Commercial Steel (CS), exposed.
- C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B; with minimum G60 or A60 metallic coating.
- D. Frame Anchors: Same material as door face.
- E. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A153/A153M or ASTM F2329.

2.6 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.
 - 1. For concealed flanges with drywall bead, provide edge trim for gypsum panels securely attached to perimeter of frames.
 - 2. For concealed flanges with plaster bead for full-bed plaster applications, provide zinc-coated expanded-metal lath and exposed casing bead welded to perimeter of frames.
- D. Latch and Lock Hardware:
 - 1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.

2.7 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in 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 contrast.

- D. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
 - 1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 FIELD QUALITY CONTROL

- A. Inspection Agency: Owner may engage a qualified inspector to perform inspections and to furnish reports to Architect.
- B. Inspections:
 - 1. Fire-Rated Door Inspections: Inspect each fire-rated access door in accordance with NFPA 80, section 5.2.
- C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.
- E. Prepare and submit separate inspection report for each fire-rated access door indicating compliance with each item listed in NFPA 80.

3.4 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION 083113

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SECTION 083323 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Insulated service doors.

- B. Related Requirements:

- 1. Section 055000 "Metal Fabrications" for miscellaneous steel supports, door-opening framing, corner guards, and bollards.
 - 2. Section 133419 "Metal Building Systems" for building systems to receive overhead coiling doors.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type and size of overhead coiling door and accessory.

- 1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.

- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

- 1. Include plans, elevations, sections, and mounting details.
 - 2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
 - 4. For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.
 - 5. Show locations of controls, locking devices and other accessories.

- C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.

1. Include similar Samples of accessories involving color selection.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and testing and inspecting agency.
- B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Special warranty.
- B. Maintenance Data: For overhead coiling doors to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.
 1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of doors that fail in materials or workmanship within specified warranty period.
 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

- B. Structural Performance, Exterior Doors: Capable of withstanding the following design wind loads:
 - 1. Design Wind Load: As indicated on Drawings.
 - 2. Testing: According to ASTM E330/E330M.
 - 3. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.
 - 4. Operability under Wind Load: Design overhead coiling doors to remain operable under design wind load, acting inward and outward.

- C. Seismic Performance: Overhead coiling doors shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. Component Importance Factor: 1.5.

2.3 DOOR ASSEMBLY

- A. Insulated Service Door: Overhead coiling door formed with curtain of interlocking metal slats.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Clopay Building Products.
 - b. Cookson Company.
 - c. Cornell.
 - d. Overhead Door Corporation.
 - e. Raynor.
 - f. Wayne-Dalton Corp.

- B. Operation Cycles: Door components and operators capable of operating for not less than 50,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
 - 1. Include tamperproof cycle counter.

- C. Air Infiltration: Maximum rate of 1.0 cfm/sq. ft. at 15 and 25 mph when tested according to ASTM E283 or DASMA 105.

- D. Curtain R-Value: 8.0 deg F x h x sq. ft./Btu.

- E. Door Curtain Material: Galvanized steel.

- F. Door Curtain Slats: Flat profile slats of nominal 3-inch center-to-center height.
 - 1. Insulated-Slat Interior Facing: Metal.
 - 2. Gasket Seal. Manufacturer's standard continuous gaskets between slats.

- G. Bottom Bar: Two angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch thick; fabricated from hot-dip galvanized steel and finished to match door.
- H. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats.
- I. Hood: Match curtain material and finish
 - 1. Shape: Round.
 - 2. Mounting: Face of wall.
- J. Locking Devices: Equip door with locking device assembly and chain lock keeper.
 - 1. Locking Device Assembly: Cremona-type, both jamb sides locking bars, operable from inside with cylinders.
- K. Manual Door Operator: Chain-hoist operator.
- L. Curtain Accessories: Equip door with weatherseals.
- M. Door Finish:
 - 1. Baked-Enamel or Powder-Coated Finish: Color as selected by Architect from manufacturer's full range.
 - 2. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

2.4 DOOR CURTAIN MATERIALS AND CONSTRUCTION

- A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
 - 1. Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural-steel sheet; complying with ASTM A653/A653M, with G90 zinc coating; nominal sheet thickness (coated) of 0.028 inch; and as required.
 - 2. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face, with minimum steel thickness of 0.010 inch.
- B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain, and a continuous bar for holding windlocks.

2.5 HOODS

- A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.
 - 1. Galvanized Steel: Nominal 0.028-inch-thick, hot-dip galvanized-steel sheet with G90 zinc coating, complying with ASTM A653/A653M.

2.6 LOCKING DEVICES

- A. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.
 - 1. Lock Cylinders: As specified in Section 087100 "Door Hardware.
 - 2. Keys: Six for each cylinder.
- B. Chain Lock Keeper: Suitable for padlock.

2.7 CURTAIN ACCESSORIES

- A. Weatherseals for Exterior Doors: Equip each exterior door with weather-stripping gaskets fitted to entire exterior perimeter of door for a weather-resistant installation unless otherwise indicated.
 - 1. At door head, use 1/8-inch-thick, replaceable, continuous-sheet baffle secured to inside of hood or field-installed on the header.
 - 2. At door jambs, use replaceable, adjustable, continuous, flexible, 1/8-inch-thick seals of flexible vinyl, rubber, or neoprene or nylon brushes.

2.8 COUNTERBALANCE MECHANISM

- A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.
- B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, seamless or welded carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.

- C. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.
 - 1. Fire-Rated Doors: Equip with auxiliary counterbalance spring and prevent tension release from main counterbalance spring when automatic-closing device operates.
- D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.
- E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.9 MANUAL DOOR OPERATORS

- A. General: Equip door with manual door operator by door manufacturer.
- B. Chain-Hoist Operator: Consisting of endless steel hand chain, chain-pocket wheel and guard, and gear-reduction unit with a maximum 25-lbf force for door operation. Provide alloy-steel hand chain with chain holder secured to operator guide.

2.10 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in 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 contrast.

2.11 STEEL AND GALVANIZED-STEEL FINISHES

- A. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Install overhead coiling doors, hoods, controls, and operators at the mounting locations indicated for each door.

3.3 FIELD QUALITY CONTROL

- A. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- B. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

3.4 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.

3.5 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
 - 1. Adjust exterior doors and components to be weather resistant.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.
- C. Adjust seals to provide tight fit around entire perimeter.

3.6 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of coiling-door Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 - 1. Perform maintenance, including emergency callback service, during normal working hours.
 - 2. Include 24-hour-per-day, seven-day-per-week, emergency callback service.

3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION 083323

SECTION 083326 - OVERHEAD COILING GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Open-curtain overhead coiling grilles.

- B. Related Requirements:

- 1. Section 017419 - Construction and Demolition Waste Management and Disposal
- 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
- 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
- 4. Section 055000 "Metal Fabrications" for miscellaneous steel supports and angle-framing of grille opening.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type and size of overhead coiling grille and accessory.

- 1. Include construction details, material descriptions, dimensions of individual components, profiles for curtain components, and finishes.

2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.

B. Sustainable Design Submittals:

1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.

C. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

1. Include plans, elevations, sections, and mounting details.
2. Include details of equipment assemblies. Indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
4. For exterior components, include details of provisions for assembly expansion and contraction.
5. Show locations of controls, locking devices, and other accessories.
6. Include diagrams for power, signal, and control wiring.

D. Samples for Initial Selection: Manufacturer's finish samples showing full range of colors and textures available for units with factory-applied finishes.

1. Include similar Samples of accessories involving color selection.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For overhead coiling grilles to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.
- B. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of grilles that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 MANUFACTURERS

- A. Source Limitations: Obtain overhead coiling grilles from single source from single manufacturer.
 - 1. Obtain operators and controls from overhead coiling-grille manufacturer.

2.3 OPEN-CURTAIN GRILLE ASSEMBLY

- A. Open-Curtain Grille: Overhead coiling, countertop grille with a curtain having a network of horizontal rods that interconnect with vertical links.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Clopay Building Products.
 - b. Cookson Company.
 - c. Cornell.
 - d. Overhead Door Corporation.
- B. Operation Cycles: Grille components and operators capable of operating for not less than 10,000. One operation cycle is complete when a grille is opened from the closed position to the fully open position and returned to the closed position.
- C. Grille Curtain Material: Aluminum.
 - 1. Rod Spacing: Approximately 3 inches o.c.
 - 2. Link Spacing: Approximately 9 inches apart in a straight in-line pattern.
 - 3. Spacers: Metal tubes matching curtain material.

- D. Bottom Bar: Continuous tubular shape, channel or doubled angles, fabricated from aluminum extrusion and finished to match grille.
- E. Curtain Jamb Guides: Aluminum. Provide continuous integral wear strips to prevent metal-to-metal contact and to minimize operational noise.
- F. Hood: Aluminum.
 - 1. Shape: Round.
 - 2. Mounting: Face of wall.
- G. Locking Devices: Equip grille with locking device assembly.
 - 1. Locking Device Assembly: Cremona-type, both jamb sides locking bars, operable from inside with thumbturn.
- H. Manual Grille Operator: Push-up operation.
- I. Grille Finish:
 - 1. Aluminum Finish: Clear anodized

2.4 GRILLE CURTAIN MATERIALS AND CONSTRUCTION

- A. Open-Curtain Grilles: Fabricate metal grille curtain as an open network of horizontal rods, spaced at regular intervals, that are interconnected with vertical links, which are formed and spaced as indicated and are free to rotate on the rods.
 - 1. Aluminum Grille Curtain: ASTM B221, alloy and temper recommended by aluminum
- B. Bottom Bar: Manufacturer's standard continuous shape unless otherwise indicated, finished to match grille.
- C. Grille Curtain Jamb Guides: Manufacturer's standard shape having curtain groove with return lips or bars to retain curtain. Provide continuous integral wear strips to prevent metal-to-metal contact and to minimize operational noise; with removable stops on guides to prevent overtravel of curtain.

2.5 HOODS AND ACCESSORIES

- A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.
 - 1. Aluminum: 0.040-inchthick aluminum sheet, complying with ASTM B209, of alloy and temper recommended by manufacturer and finisher for type of use and finish indicated.

- B. Push/Pull Handles: Equip push-up-operated or emergency-operated grille with lifting handles on each side of grille, finished to match grille.
- C. Pole Hooks: Provide pole hooks and poles for grilles.

2.6 LOCKING DEVICES

- A. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.
- B. Chain Lock Keeper: Suitable for padlock.

2.7 COUNTERBALANCE MECHANISM

- A. General: Counterbalance grilles by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.
- B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, seamless or welded carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of parts and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.
- C. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.
- D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.
- E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.8 MANUAL GRILLE OPERATORS

- A. General: Equip grille with manual grille operator by grille manufacturer.
- B. Push-up Grille Operation: Lift handles and pull rope for raising and lowering grille, with counterbalance mechanism designed so that required lift or pull for grille operation does not exceed 25 lbf.

2.9 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.

- B. Appearance of Finished Work: Noticeable variations in 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 contrast.

2.10 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install overhead coiling grilles and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports, according to manufacturer's written instructions and as specified.
- B. Install overhead coiling grilles, hoods, controls, and operators at the mounting locations indicated for each grille.
- C. Accessibility: Install overhead coiling grilles, switches, and controls along accessible routes in compliance with the accessibility standard.

3.3 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 1. Complete installation and startup checks according to manufacturer's written instructions.
 2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.
 3. Test grille opening when activated by detector, fire-alarm system, emergency-egress release, or self-opening mechanism as required. Reset grille-opening mechanism after successful test.

3.4 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly, so that grilles operate easily, free of warp, twist, or distortion.
 - 1. Adjust exterior components to be weather resistant.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling grilles.

END OF SECTION 083326

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SECTION 084213 - ALUMINUM-FRAMED ENTRANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Aluminum-framed entrance door systems.

- B. Related Requirements:

- 1. Section 017419 - Construction and Demolition Waste Management and Disposal
 - 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
 - 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
 - 4. Section 087100 "Door hardware" for cylinders for hardware factory installed in aluminum doors.
 - 5. Section 088000 "Glazing" for glazing within aluminum-framed entrance doors.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Sustainable Design Submittals:
1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Shop Drawings: For aluminum-framed entrances. Include plans, elevations, sections, full-size details, and attachments to other work.
1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
 2. Include full-size isometric details of each type of vertical-to-horizontal intersection of aluminum-framed entrances, showing the following:
 - a. Joinery, including concealed welds.
 - b. Anchorage.
 - c. Expansion provisions.
 - d. Glazing.
 - e. Flashing and drainage.
 3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
 4. Include point-to-point wiring diagrams showing the following:
 - a. Power requirements for each electrically operated door hardware.
 - b. Location and types of switches, signal device, conduit sizes, and number and size of wires.
- D. Samples for Initial Selection: For units with factory-applied color finishes.
- E. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- F. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.
- 1.5 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For Installer.
- B. Energy Performance Certificates: For aluminum-framed entrances, accessories, and components, from manufacturer.

1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance.

C. Product Test Reports: For aluminum-framed entrances.

D. Field quality-control reports.

E. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum-framed entrances to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Testing Agency Qualifications: Qualified according to ASTM E699 for testing indicated and acceptable to Owner and Architect.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

B. Special Finish Warranty, Factory-Applied Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

- a. Color fading more than 5 Delta E units when tested according to ASTM D2244.
- b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
- c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. EFCO Corporation.
 - 2. Kawneer North America, an Arconic company.
 - 3. Oldcastle BuildingEnvelope.
 - 4. U.S. Aluminum; a brand of C.R. Laurence.
- B. Source Limitations: Obtain all components of aluminum-framed entrance, including framing and accessories, from single manufacturer.

2.3 PERFORMANCE REQUIREMENTS

- A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Structural Loads:
 - 1. Wind Loads: As indicated on Drawings.
- C. Structural: Test according to ASTM E330/E330M as follows:
 - 1. When tested at positive and negative wind-load design pressures, entrance doors do not evidence deflection exceeding specified limits.
 - 2. When tested at 150 percent of positive and negative wind-load design pressures, entrance doors, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
 - 3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- D. Water Penetration under Static Pressure: Test according to ASTM E331 as follows:
 - 1. No evidence of water penetration through fixed glazing and framing areas of entrance doors when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 10 lbf/sq. ft.

- E. Energy Performance: Certified and labeled by manufacturer for energy performance as follows:
1. Thermal Transmittance (U-factor):
 - a. Entrance Doors: U-factor of not more than 0.68 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
 2. Air Leakage:
 - a. Entrance Doors: Air leakage of not more than < 0.5 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft..
 3. Condensation Resistance Factor (CRF):
 - a. Entrance Doors: As determined according to AAMA 1503.
 - 1) CRF of not less than 40 at the frame
 - 2) CRF of not less than 52 at the glass.
- F. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.4 ALUMINUM-FRAMED ENTRANCE DOOR SYSTEMS

- A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.
1. Door Construction: 2- to 2-1/4-inch overall thickness, with minimum 0.125-inch- thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
 - a. Thermal Construction: Provide manufacturer's standard thermal break
 2. Door Design: Medium stile; 3-1/2-inch nominal width.
 3. Glazing Stops and Gaskets: Square or Bevel, snap-on, extruded-aluminum stops and preformed gaskets.
 - a. Provide nonremovable glazing stops on outside of door.
 4. Door Finish: High-performance organic finish.
- B. Framing Members: Manufacturer's standard extruded aluminum, minimum 0.125 inch thick and reinforced as required to support imposed loads.
1. Nominal Size: 1-3/4 by 6 inches.
 2. Exterior Framing Construction: Thermally broken.
 3. Sidelights and Interior Vestibule Framing Construction: Same as Exterior.

4. Finish: Match door finish.
- C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- E. Materials:
 1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - a. Sheet and Plate: ASTM B209.
 - b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221.
 - c. Extruded Structural Pipe and Tubes: ASTM B429/B429M.
 - d. Structural Profiles: ASTM B308/B308M.
 2. Steel Reinforcement:
 - a. Structural Shapes, Plates, and Bars: ASTM A36/A36M.
 - b. Cold-Rolled Sheet and Strip: ASTM A1008/A1008M.
 - c. Hot-Rolled Sheet and Strip: ASTM A1011/A1011M.
 3. Steel Reinforcement Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.
 4. Recycled Content of Aluminum Components: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.

2.5 ENTRANCE DOOR HARDWARE

- A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 087100 "Door Hardware."
- B. General: Provide entrance door hardware and entrance door hardware sets indicated in door and frame schedule and Door Hardware Sets Article for each entrance door, to comply with requirements in this Section.
 1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products equivalent in function and comparable in quality to named products and complying with BHMA standard referenced.
 2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
 3. Opening-Force Requirements:

- a. Egress Doors: Not more than 15 lbf to release the latch and not more than 30 lbf to set the door in motion and not more than 15 lbf to open the door to its minimum required width.
 - b. Accessible Interior Doors: Not more than 5 lbf to fully open door.
- C. Designations: Requirements for design, grade, function, finish, quantity, size, and other distinctive qualities of each type of entrance door hardware are indicated in "Entrance Door Hardware Sets" Article. Products are identified by using entrance door hardware designations as follows:
- 1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in "Entrance Door Hardware Sets" Article.
 - 2. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.
- D. Butt Hinges: BHMA A156.1, Grade 1, radius corner.
- 1. Nonremovable Pins: Provide setscrew in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while entrance door is closed.
 - 2. Exterior Hinges: Stainless steel, with stainless-steel pin.
 - 3. Quantities:
 - a. For doors up to 87 inches high, provide three hinges per leaf.
- E. Mortise Auxiliary Locks: BHMA A156.5, Grade 1.
- F. Manual Flush Bolts: BHMA A156.16, Grade 1.
- G. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- H. Cylinders:
- 1. As specified in Section 087100 "Door Hardware."
 - 2. BHMA A156.5, Grade 1.
 - a. Keying: Master key system. Coordinate cylinders to be compatible with Owner's Master Key System.
- I. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.
- J. Operating Trim: BHMA A156.6.
- K. Closers: BHMA A156.4, Grade 1, with accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to comply with field conditions and requirements for opening force.

- L. Door Stops: BHMA A156.16, Grade 1, floor or wall mounted, as appropriate for door location indicated, with integral rubber bumper.
- M. Weather Stripping: Manufacturer's standard replaceable components.
 - 1. Compression Type: Made of ASTM D2000 molded neoprene or ASTM D2287 molded PVC.
 - 2. Sliding Type: AAMA 701/702, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.
- N. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
- O. Thresholds: BHMA A156.21 raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch.

2.6 GLAZING

- A. Glazing: Comply with Section 088000 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

2.7 ACCESSORIES

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 - 2. Reinforce members as required to receive fastener threads.
 - 3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system or fabricated from 300 series stainless steel.
- B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
 - 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A123/A123M or ASTM A153/A153M requirements.
- C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- D. Bituminous Paint: Cold-applied asphalt-mastic paint containing no asbestos, formulated for 30-mil thickness per coat.

2.8 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Physical and thermal isolation of glazing from framing members.
 - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 5. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
 - 1. At interior and exterior doors, provide compression weather stripping at fixed stops.
- E. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
 - 1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
 - 2. At exterior doors, provide weather sweeps applied to door bottoms.
- F. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- G. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.9 ALUMINUM FINISHES

- A. High-Performance Organic Finish, Two-Coat PVDF: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat.
 - 1. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 2. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Comply with manufacturer's written instructions.
- B. Do not install damaged components.
- C. Fit joints to produce hairline joints free of burrs and distortion.
- D. Rigidly secure nonmovement joints.
- E. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
- F. Seal perimeter and other joints watertight unless otherwise indicated.
- G. Metal Protection:
 - 1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or installing nonconductive spacers.
 - 2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- H. Set continuous sill members and flashing in full sealant bed, as specified in Section 079200 "Joint Sealants," to produce weathertight installation.
- I. Install joint filler behind sealant as recommended by sealant manufacturer.
- J. Install components plumb and true in alignment with established lines and grades.

3.3 INSTALLATION OF GLAZING

- A. Install glazing as specified in Section 088000 "Glazing."

3.4 INSTALLATION OF ALUMINUM-FRAMED ENTRANCE DOORS

- A. Install entrance doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.

END OF SECTION 084213

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SECTION 085200 - WOOD WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes aluminum-clad wood windows.
- B. Related Work Specified Elsewhere:
 - 1. Section 017419 - Construction and Demolition Waste Management and Disposal
 - 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
 - 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review, discuss, and coordinate the interrelationship of wood windows with other exterior wall components. Include provisions for anchoring, flashing, weeping, sealing perimeters, and protecting finishes.

3. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.
4. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

1.5 ACTION SUBMITTALS

- A. LEEDv4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- B. Product Data: For each type of product.
 1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for wood windows.
- C. Sustainable Design Submittals:
 1. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
 2. Chain-of-Custody Qualification Data: For manufacturer and vendor.
- D. Shop Drawings: For wood windows.
 1. Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.
- E. Samples: For each exposed product and for each color specified, 2 by 4 inches in size.
- F. Samples for Initial Selection: For units with factory-applied finishes.
 1. Include Samples of hardware and accessories involving color selection.
- G. Samples for Verification: For wood windows and components required, prepared on Samples of size indicated below:
 1. Exposed Finishes: 2 by 4 inches.
 2. Exposed Hardware: Full-size units.
- H. Product Schedule: For wood windows. Use same designations indicated on Drawings.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each type of wood window, for tests performed by a qualified testing agency.

- C. Field quality-control reports.
- D. Sample Warranties: For manufacturer's warranties.

1.7 QUALITY ASSURANCE

- A. Certified Wood: Provide an invoice including vendor's chain-of-custody number, product cost, and entity being invoiced.
- B. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.
- C. Installer Qualifications: An installer acceptable to wood window manufacturer for installation of units required for this Project.
- D. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Build mockup of typical wall area including full window unit, trim and casing. Prepare mockup at location directed by Architect.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace wood windows that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure to meet performance requirements.
 - b. Structural failures including excessive deflection, water leakage, and air infiltration.
 - c. Faulty operation of movable sash and hardware.
 - d. Deterioration of materials and finishes beyond normal weathering.
 - e. Failure of insulating glass.
 - 2. Warranty Period:
 - a. Window: 10 years from date of Substantial Completion.
 - b. Glazing Units: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain wood windows from single source from single manufacturer.

2.2 LEED PERFORMANCE REQUIRMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.3 WINDOW PERFORMANCE REQUIREMENTS

- A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
 - 1. Window Certification: WDMA certified with label attached to each window.
- B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:
 - 1. Minimum Performance Class: CW.
 - 2. Minimum Performance Grade: 50.
- C. Thermal Transmittance: NFRC 100 maximum whole-window U-factor:
 - 1. Operable Units: 0.20 Btu/sq. ft. x h x deg F.
 - 2. Fixed Units: 0.18 Btu/sq. ft. x h x deg F
- D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.35.

2.4 WOOD WINDOWS

- A. Aluminum-Clad Wood Windows:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Marvin Windows and Doors; Ultimate Casement and Awning Collection or a comparable product by one of the following:
 - a. Kolbe & Kolbe Millwork Co., Inc.
 - b. Pella Corporation.
- B. Operating Types: Provide the following operating types in locations indicated on Drawings:
 - 1. Casement: Project out.

2. Awning: Project out.
 3. Fixed.
- C. Certified Wood: Certify wood products as "FSC Mixed Credit" in accordance with FSC STD-01-001 and FSC STD-40-004.
- D. Frames and Sashes: Fine-grained wood lumber complying with AAMA/WDMA/CSA 101/I.S.2/A440; kiln dried to a moisture content of not more than 12 percent at time of fabrication; free of visible finger joints, blue stain, knots, pitch pockets, and surface checks larger than 1/32 inch deep by 2 inches wide; water-repellent preservative treated.
1. Exterior Finish: Extruded Aluminum-clad wood.
 - a. Aluminum Finish: Manufacturer's standard fluoropolymer two-coat system with fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight and complying with all requirements of AAMA 2605.
 - b. Color: As selected by Architect from manufacturer's full range.
 2. Interior Finish: Manufacturer's standard clear stain-and-varnish finish.
 - a. Exposed Unfinished Wood Surfaces: Mixed Grain Douglas Fir (MGDF).
 - b. Color: Clear Finish .
- E. Insulating-Glass Units: ASTM E2190.
1. Type: Triple Pane, Low-E 2
 2. Glass: ASTM C1036, Type 1, Class 1, q3.
 - a. Tint: Clear.
 - b. Kind: Fully tempered where indicated on Drawings.
 3. Lites: One.
 4. Filling: Fill space between glass lites with argon.
 5. Low-E Coating: On inside surface of two panes.
- F. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.
- G. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.
1. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range.
- H. Projected Window Hardware:

1. Gear-Type Rotary Operators: Complying with AAMA 901 when tested according to ASTM E405, Method A. Provide operators that function without requiring the removal of interior screens or using screen wickets.
 - a. Type and Style: As selected by Architect from manufacturer's full range of types and styles.
 2. Hinges: Manufacturer's standard type for sash weight and size indicated.
 3. Single-Handle Locking System: Operates positive-acting arms that pull sash into locked position. Provide one arm on sashes up to 29 inches tall and two arms on taller sashes.
 4. Limit Devices: Where indicated, Concealed support arms with adjustable, limited, hold-open limit devices designed to restrict sash opening.
 - a. Limit clear opening to 6 inches for ventilation; with custodial key release.
 5. Operator Stud Cover: Matching operator handle finish. Provide in locations where operator handle is removed for controlled access.
 6. Pole Operators: Tubular-shaped anodized aluminum; with rubber-capped lower end and standard push-pull hook at top to match hardware design; of sufficient length to operate window without reaching more than 60 inches above floor; one pole operator and pole hanger per room that has operable windows more than 72 inches above floor.
 7. Electric Operators: Where indicated, provide manufacturer's standard electric sash operator. Basis of Design is Sentry II by Truth hardware, provided by Marvin Windows.
 - a. Provide one motor per window.
 - b. Each window to have an Op-O-Lock, in lieu of side locks, to allow the window to be locked at the sill when the electric operator is closed.
 - c. Provide the following components, inclusive of installation for a completely operational system:
 - 1) Motor with cover
 - 2) Control Unit with Cover Plate
 - 3) Mounting Bracket
 - 4) Rain Sensor
 - 5) Termination Block
 - 6) Wiring and hardware as required for proper installation and operation
 - 7) Remote Control Operators with wall mounting holder.
- I. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.
- J. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.
1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.5 INSECT SCREENS

- A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.
 - 1. Type and Location: Full, inside for project-out sashes.
- B. Glass-Fiber Mesh Fabric: 18-by-14 or 18-by-16 mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration. Comply with ASTM D3656/D3656M.
 - 1. Mesh Color: To be selected by Architect from manufacturer's full range of options.

2.6 FABRICATION

- A. Fabricate wood windows in sizes indicated. Include a complete system for installing and anchoring windows.
- B. Glaze wood windows in the factory.
- C. Weather strip each operable sash to provide weathertight installation.
- D. Mullions: Provide mullions and cover plates, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units.
- E. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.
- C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.
- B. Install windows level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections.
 - 1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Testing Services: Testing and inspecting of installed windows shall take place as follows:
 - 1. Testing Methodology: Testing of windows for air infiltration and water resistance shall be performed according to AAMA 502.
 - 2. Air-Infiltration Testing:
 - a. Test Pressure: That required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance class indicated.
 - b. Allowable Air-Leakage Rate: 1.5 times the applicable AAMA/WDMA/CSA 101/I.S.2/A440 rate for product type and performance class rounded down to one decimal place.
 - 3. Water-Resistance Testing:
 - a. Test Pressure: Two-thirds times test pressure required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance grade indicated.
 - b. Allowable Water Infiltration: No water penetration.
 - 4. Testing Extent: Three windows of each type as selected by Architect and a qualified independent testing and inspecting agency. Windows shall be tested after perimeter sealants have cured.
 - 5. Test Reports: Prepared according to AAMA 502.
- C. Windows will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.4 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.
- B. Clean exposed surfaces immediately after installing windows. Remove excess sealants, glazing materials, dirt, and other substances.
 - 1. Keep protective films and coverings in place until final cleaning.
- C. Remove and replace sashes if glass has been broken, chipped, cracked, abraded, or damaged during construction period.
- D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END OF SECTION 085200

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SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Mechanical door hardware for the following:
 - a. Swinging doors.
- 2. Cylinders for door hardware specified in other Sections.
- 3. Electrified door hardware.

- B. Related Requirements:

- 1. Section 017419 - Construction and Demolition Waste Management and Disposal
- 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
- 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
- 4. Section 081113 "Hollow Metal Doors and Frames" for astragals provided as part of labeled fire-rated assemblies and for door silencers provided as part of hollow-metal frames.
- 5. Section 081416 "Flush Wood Doors" for intumescent seals provided as part of labeled fire-rated assemblies.
- 6. Section 083323 "Overhead Coiling Doors" for door hardware provided as part of overhead coiling door assemblies.
- 7. Section 083326 "Overhead Coiling Grilles" for door hardware provided as part of overhead coiling grille assemblies.
- 8. Section 084113 "Aluminum-Framed Entrances and Storefronts" for entrance door hardware, except cylinders.
- 9. Section 133419 "Metal Building Systems" for door hardware, except cylinders.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification

1.4 COORDINATION

- A. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- B. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- C. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation and Keying Conference: Conduct conference at Project site.
 - 1. Conference participants shall include Installer's Architectural Hardware Consultant and Owner's security consultant.
 - 2. Incorporate conference decisions into keying schedule after reviewing door hardware keying system including, but not limited to, the following:
 - a. Flow of traffic and degree of security required.
 - b. Preliminary key system schematic diagram.
 - c. Requirements for key control system.
 - d. Requirements for access control.
 - e. Address for delivery of keys.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

- B. LEEDv4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Shop Drawings: For electrified door hardware.
 - 1. Include diagrams for power, signal, and control wiring.
 - 2. Include details of interface of electrified door hardware and building safety and security systems.
- D. Samples: For each exposed product in each finish specified, in manufacturer's standard size.
 - 1. Tag Samples with full product description to coordinate Samples with door hardware schedule.
- E. Samples for Initial Selection: For each type of exposed finish.
- F. Samples for Verification: For each type of exposed product, in each finish specified.
 - 1. Sample Size: Full-size units or minimum 2-by-4-inch Samples for sheet and 4-inch long Samples for other products.
 - a. Full-size Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.
 - 2. Tag Samples with full product description to coordinate Samples with door hardware schedule.
- G. Door Hardware Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant. Coordinate door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
 - 2. Format: Use same scheduling sequence and format and use same door numbers as in door hardware schedule in the Contract Documents.
 - 3. Content: Include the following information:
 - a. Identification number, location, hand, fire rating, size, and material of each door and frame.
 - b. Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
 - c. Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.

- d. Description of electrified door hardware sequences of operation and interfaces with other building control systems.
 - e. Fastenings and other installation information.
 - f. Explanation of abbreviations, symbols, and designations contained in door hardware schedule.
 - g. Mounting locations for door hardware.
 - h. List of related door devices specified in other Sections for each door and frame.
- H. Keying Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and Architectural Hardware Consultant.
- B. Product Certificates: For each type of electrified door hardware.
 - 1. Certify that door hardware for use on each type and size of labeled fire-rated doors complies with listed fire-rated door assemblies.
- C. Product Test Reports: For compliance with accessibility requirements, for tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.
- D. Field quality-control reports.
- E. Sample Warranty: For special warranty.

1.8 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals.
- B. Schedules: Final door hardware and keying schedule.

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and of an Architectural Hardware Consultant who is available during the course of the Work to consult Contractor, Architect, and Owner about door hardware and keying.
 - 1. Warehousing Facilities: In Project's vicinity.
 - 2. Scheduling Responsibility: Preparation of door hardware and keying schedule.

3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as an Architectural Hardware Consultant (AHC) and an Electrified Hardware Consultant (EHC).

1.10 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

C. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.11 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

- a. Structural failures including excessive deflection, cracking, or breakage.
- b. Faulty operation of doors and door hardware.
- c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period: Three years from date of Substantial Completion unless otherwise indicated below:

- a. Electronic Locks: Five years from date of Substantial Completion.
- b. Exit Devices: Two years from date of Substantial Completion.
- c. Manual Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 MANUFACTURERS

- A. Source Limitations: Obtain each type of door hardware from single manufacturer.
 - 1. Provide electrified door hardware from same manufacturer as mechanical door hardware unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

2.3 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Where fire-rated doors are indicated, provide door hardware complying with NFPA 80 that is listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
- B. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- D. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the DOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.
 - 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
 - 2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
 - b. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
 - 3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.
 - 4. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.
 - 5. Adjust spring hinges so that, from an open position of 70 degrees, the door will take at least 1.5 seconds to move to the closed position.

2.4 HINGES

- A. Hinges: BHMA A156.1. Provide template-produced hinges.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Stanley Commercial Hardware; a division of Stanley Security Solutions ; Div. of The Stanley Works.. or a comparable product by one of the following:

- a. Baldwin Hardware Corporation.
- b. Hager Companies.
- c. McKinney Products Company; an ASSA ABLOY Group company.

2.5 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: As indicated in door hardware schedule.
- B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
 1. Mortise Locks: Minimum 3/4-inch latchbolt throw.
 2. Deadbolts: Minimum 1.25-inch bolt throw.
- C. Lock Backset: 2-3/4 inches unless otherwise indicated.
- D. Lock Trim:
 1. Description: Handicapped accessible, lever, with return.
 2. Levers: Cast.
 3. Escutcheons (Roses): Cast.
 4. Dummy Trim: Match lever lock trim and escutcheons.
- E. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.
 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 3. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
- F. Mortise Locks: BHMA A156.13; Security Grade 1; stamped steel case with steel or brass parts; Series 1000.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Corbin Russwin, Inc.; an ASSA ABLOY Group company.
 - b. SARGENT Manufacturing Company; ASSA ABLOY.
 - c. Yale Security Inc; an ASSA ABLOY Group company.

2.6 AUXILIARY LOCKS

- A. Mortise Auxiliary Locks: BHMA A156.36; Grade 1; with strike that suits frame.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Arrow USA; an ASSA ABLOY Group company.
 - b. SARGENT Manufacturing Company; ASSA ABLOY.
 - c. Yale Security Inc; an ASSA ABLOY Group company.

2.7 ELECTRIC STRIKES

- A. Electric Strikes: BHMA A156.31; Grade 1; with faceplate to suit lock and frame.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Adams Rite Manufacturing Co; an ASSA ABLOY Group company.
 - b. Dortronics Systems, Inc.
 - c. Security Door Controls.
2. Verify compatibility of components and relays with Owner's security requirements.

2.8 ELECTROMECHANICAL LOCKS

- A. Electromechanical Locks: BHMA A156.25; Grade 1; motor or solenoid driven; with strike that suits frame.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. DynaLock Corp.
 - b. SARGENT Manufacturing Company; ASSA ABLOY.
 - c. Yale Security Inc; an ASSA ABLOY Group company.
2. Type: Mortise deadlocking latchbolt.

2.9 SURFACE BOLTS

- A. Surface Bolts: BHMA A156.16.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Allegion plc.
 - b. Burns Manufacturing Incorporated.
 - c. Door Controls International, Inc.

2.10 MANUAL FLUSH BOLTS

- A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch throw; designed for mortising into door edge.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Adams Rite Manufacturing Co; an ASSA ABLOY Group company.
 - b. Allegion plc.
 - c. Door Controls International, Inc.

2.11 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items: BHMA A156.3.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Arrow USA; an ASSA ABLOY Group company.
 - b. Corbin Russwin, Inc.; an ASSA ABLOY Group company.
 - c. DORMA USA, Inc.
 - d. SARGENT Manufacturing Company; ASSA ABLOY.
 - e. Yale Security Inc; an ASSA ABLOY Group company.

2.12 LOCK CYLINDERS

- A. High-Security Lock Cylinders: BHMA A156.30; Grade 1 permanent cores that are removable; face finished to match lockset.
 - 1. Type: M, mechanical.
- B. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.13 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, appendix. Provide one extra key blank for each lock. Incorporate decisions made in keying conference.
 - 1. Grand Master Key System: Change keys, a master key, and a grand master key operate cylinders.
 - a. Provide three cylinder change keys and five each of master and grand master keys.
- B. Keys: Brass.

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
 - a. Notation: Information to be provided by Owner.

2.14 KEY CONTROL SYSTEM

- A. Key Control Cabinet: BHMA A156.28; metal cabinet with baked-enamel finish; containing key-holding hooks, labels, two sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of 150 percent of the number of locks.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. American Key Boxes and Cabinets.
 - b. MMF Industries.
 - c. United Technologies Corporation (UTC Climate, Controls & Security - Interlogix).
 2. Wall-Mounted Cabinet: Grade 1 cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock.

2.15 OPERATING TRIM

- A. Operating Trim: BHMA A156.6; stainless steel unless otherwise indicated.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Allegion plc.
 - b. Burns Manufacturing Incorporated.
 - c. Forms+Surfaces.
 - d. Hager Companies.

2.16 ACCESSORIES FOR PAIRS OF DOORS

- A. Astragals: BHMA A156.22.

2.17 SURFACE CLOSERS

- A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Corbin Russwin, Inc.; an ASSA ABLOY Group company.
 - b. DORMA USA, Inc.
 - c. Norton Door Controls; an ASSA ABLOY Group company.
 - d. SARGENT Manufacturing Company; ASSA ABLOY.
 - e. Stanley Commercial Hardware; a division of Stanley Security Solutions.
 - f. Yale Security Inc; an ASSA ABLOY Group company.

2.18 MECHANICAL STOPS AND HOLDERS

A. Wall- and Floor-Mounted Stops: BHMA A156.16.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Baldwin Hardware Corporation.
 - b. Burns Manufacturing Incorporated.
 - c. Door Controls International, Inc.
 - d. Hager Companies.

2.19 OVERHEAD STOPS AND HOLDERS

A. Overhead Stops and Holders: BHMA A156.8.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. DORMA USA, Inc.
 - b. Hager Companies.
 - c. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
 - d. SARGENT Manufacturing Company; ASSA ABLOY.

2.20 DOOR GASKETING

A. Door Gasketing: BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Pemko; an ASSA ABLOY Group Company.
 - b. Reese Enterprises, Inc.
 - c. Zero International; an Allegion brand.

- B. Maximum Air Leakage: When tested according to ASTM E283 with tested pressure differential of 0.3-inch wg, as follows:
 - 1. Gasketing on Single Doors: 0.3 cfm/sq. ft. of door opening.
 - 2. Gasketing on Double Doors: 0.50 cfm per foot of door opening.

2.21 THRESHOLDS

- A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Pemko; an ASSA ABLOY Group Company.
 - b. Reese Enterprises, Inc.
 - c. Zero International; an Allegion brand.

2.22 METAL PROTECTIVE TRIM UNITS

- A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch-thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Burns Manufacturing Incorporated.
 - b. Hager Companies.
 - c. Rockwood Manufacturing Company; an ASSA ABLOY Group company.

2.23 AUXILIARY DOOR HARDWARE

- A. Auxiliary Hardware: BHMA A156.16.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Baldwin Hardware Corporation.
 - b. Hager Companies.
 - c. Rockwood Manufacturing Company; an ASSA ABLOY Group company.

2.24 AUXILIARY ELECTRIFIED DOOR HARDWARE

- A. Auxiliary Electrified Door Hardware:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Door Controls International, Inc.
- b. DORMA USA, Inc.
- c. Hager Companies.
- d. SARGENT Manufacturing Company; ASSA ABLOY.
- e. United Technologies Corporation (UTC Climate, Controls & Security - Interlogix).

2.25 FABRICATION

- A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rating labels and as otherwise approved by Architect.
 1. Manufacturer's identification is permitted on rim of lock cylinders only.
- B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.
- C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware unless otherwise indicated.
 1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
 2. Fire-Rated Applications:
 - a. Wood or Machine Screws: For the following:
 - 1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and frames.
 - 2) Strike plates to frames.
 - 3) Closers to doors and frames.
 3. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.26 FINISHES

- A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Steel Doors and Frames: For surface-applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
- B. Wood Doors: Comply with door and hardware manufacturers' written instructions.

3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Custom Steel Doors and Frames: HMMA 831.
 - 3. Wood Doors: DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.

2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
 - C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
 - D. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 1. Replace construction cores with permanent cores as directed by Owner.
 - E. Key Control System:
 1. Key Control Cabinet: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
 - F. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room. Verify location with Architect.
 1. Configuration: Provide one power supply for each door opening with electrified door hardware.
 - G. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."
 - H. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
 - I. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
 1. Do not notch perimeter gasketing to install other surface-applied hardware.
 - J. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
 - K. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.
- 3.4 FIELD QUALITY CONTROL
- A. Independent Architectural Hardware Consultant: Owner may engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.
 1. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
 - 2. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 70 degrees and so that closing time complies with accessibility requirements of authorities having jurisdiction.
 - 3. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.

- B. Occupancy Adjustment: Approximately three months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.6 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.7 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

3.8 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain door hardware.

3.9 DOOR HARDWARE SCHEDULE

A. Hardware Sets:

1. Doors (Exterior Door(s)):

| Quantity: | Item: |
|-----------|--|
| 3 | Hinges (at Door A15 add 3 hinges) |
| 1 | Panic Rail Exit Device, with Lever Lockset at Exterior |
| 1 | Electromechanical Lock with Electric Strike |
| 1 | Closer |
| 1 | Threshold |
| 1 | Weatherstripping |
| 1 | Bottom Sweep |
| 2 | Manual Flush Bolts (At Door A15) |

2. Doors (Single Door):

| Quantity: | Item: |
|-----------|--|
| 3 | Hinges |
| 1 | Panic Rail Exit Device, with Lever Lockset at Exterior |
| 1 | Closer |
| 1 | Threshold |
| 1 | Weatherstripping |
| 1 | Bottom Sweep |

3. Doors (Office Door):

| Quantity: | Item: |
|-----------|--------------------------------|
| 3 | Hinges |
| 1 | Lever Lockset, Office Function |
| 1 | Floor Stop |

4. Doors (Secure Storage):

| Quantity: | Item: |
|-----------|---|
| 3 | Hinges |
| 1 | Lever Lockset, Storeroom Function |
| 1 | Electromechanical Lock with Electric Strike |
| 1 | Proxy Card Controller |
| 1 | Closer |

5. Doors (Varies):

| Quantity: | Item: |
|-----------|-----------------------------------|
| 3 | Hinges |
| 1 | Lever Lockset, Storeroom Function |
| 1 | Closer |

6. Doors (Exit Only, No operable exterior hardware):

| Quantity: | Item: |
|-----------|---|
| 3 | Hinges |
| 1 | Lever Lockset, Exit Function (No operable hardware at exterior of building) |
| 1 | Closer |
| 1 | Threshold |
| 1 | Weatherstripping |
| 1 | Bottom Sweep |

7. Doors (Single Occupancy Toilet or Shower):

| Quantity: | Item: |
|-----------|---------------------------------|
| 3 | Hinges |
| 1 | Lever Lockset, Privacy Function |
| 1 | Closer |

8. Doors (Interior Stair Door – 1 Hour Fire Rated):

| Quantity: | Item: |
|-----------|----------------------------------|
| 3 | Hinges |
| 1 | Lever Latchset, Passage Function |
| 1 | Closer |

9. Doors (Interior Vestibule – 1 Hour Fire Rated):

| Quantity: | Item: |
|-----------|----------------------------------|
| 6 | Hinges |
| 1 | Lever Latchset, Passage Function |
| 2 | Manual Flush Bolts |
| 1 | Closer |

Note: Inactive leaf to have no operating hardware. Provide just hinges and pair of manual flush bolts.

10. Doors (Mechanical Room):

| Quantity: | Item: |
|-----------|---|
| 6 | Hinges |
| 1 | Lever Latchset, Storeroom Function with Tactile Lever |
| 2 | Manual Flush Bolts |
| 1 | Closer |

Note: Inactive leaf to have no operating hardware. Provide just hinges and pair of manual flush bolts.

11. Doors (Mechanical Room (1 hour fire rated at A24)):

| Quantity: | Item: |
|-----------|--|
| 3 | Hinges |
| 1 | Lever Lockset, Storeroom Function with Tactile Lever |
| 1 | Closer |
| 1 | Overhead Hold Open Device |

12. Doors (Public Toilet Rooms):

| Quantity: | Item: |
|-----------|-------|
|-----------|-------|

| | |
|---|----------------------------------|
| 3 | Hinges |
| 1 | Lever Latchset, Passage Function |
| 1 | Closer |

13. Doors (Cylinders for Aluminum Doors and OH Coiling Doors):

| Quantity: | Item: |
|-----------|--|
| 1ea | Provide matching cylinders for doors with hardware specified in other Sections |

14. Door (Pair Exterior Doors)

| Quantity: | Item: |
|-----------|--------------------------------|
| 6 | Hinges |
| 1 | Lever Latchset, Entry Function |
| 2 | Manual Flush Bolts |
| 1 | Closer |

Note: Inactive leaf to have no operating hardware. Provide just hinges and pair of manual flush bolts.

15. Doors (Office Door):

| Quantity: | Item: |
|-----------|--------------------------------|
| 3 | Hinges |
| 1 | Lever Lockset, Office Function |
| 1 | Closer |

16. Doors (Interior Door – 1 Hour Fire Rated):

| Quantity: | Item: |
|-----------|--|
| 3 | Hinges |
| 1 | Lever Latchset, Office Function (Panic Rail Exit Device, with Lever Lockset at Exterior at Door A12) |
| 1 | Electromechanical Lock with Electric Strike (at Door A12) |
| 1 | Proxy Card Controller (at Door A12) |
| 1 | Closer |

END OF SECTION 087100

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Glass products.
2. Insulating glass.
3. Glazing sealants.
4. Glazing tapes.
5. Miscellaneous glazing materials.

- B. Related Requirements:

1. Section 017419 - Construction and Demolition Waste Management and Disposal
2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
4. Section 081113 "Hollow Metal Doors and Frames"
5. Section 081416 "Flush Wood Doors" for wood doors installed in metal frames.
6. Section 084213 "Aluminum-Framed Entrance"
7. Section 085200 "Wood Windows" for glazing in manufactured wood windows.
8. Section 102800 "Toilet, Bath and Laundry Accessories" for framed mirrors.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification

1.4 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters in accordance with ASTM C1036.
- C. IBC: International Building Code.
- D. Interspace: Space between lites of an insulating-glass unit.

1.5 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. LEEDv4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Glass Samples: For each type of the following products; 12 inches square.
 - 1. Tempered glass
 - 2. Insulating glass unit.
- D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturers of fabricated glass units.
- B. Product Certificates: For glass.
- C. Product Test Reports: For fabricated glass and glazing sealants, for tests performed by a qualified testing agency.
 - 1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- D. Preconstruction adhesion and compatibility test report.

- E. Sample Warranties: For special warranties.

1.8 QUALITY ASSURANCE

- A. Fabricated-Glass Manufacturer Qualifications: A qualified manufacturer of fabricated glass units who is approved by primary glass manufacturer.
- B. Installer Qualifications: A qualified glazing contractor for this Project who is certified under the North American Contractor Certification Program (NACC) for Architectural Glass & Metal (AG&M) contractors.
- C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021 to conduct the testing indicated.
- E. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
 - 1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
 - 2. Use ASTM C1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
 - 3. Test no fewer than two Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
 - 4. Schedule enough time for testing and analyzing results to prevent delaying the Work.
 - 5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials in accordance with manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

1.11 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is obstruction of vision by dust, moisture, or film on interior surfaces of glass.
 1. Warranty Period: 10 years from date of Substantial Completion.
- C. Manufacturer's Special Warranty for Tempered Glass: Manufacturer agrees to replace heat-soaked tempered glass units that spontaneously break due to nickel sulfide (NiS) inclusions at a rate exceeding 0.3 percent (3/1000) within specified warranty period. Coverage for any other cause is excluded.
 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIRMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 MANUFACTURERS

- A. Source Limitations for Glass: Obtain glass from single source from single manufacturer for each type.
- B. Source Limitations for Glazing Accessories: For each product and installation method, obtain from single source from single manufacturer.

2.3 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined in accordance with the IBC and ASTM E1300:
 - 1. Design Wind Pressures: As indicated on Drawings.
 - a. Wind Design Data: As indicated on Drawings.
 - b. Basic Wind Speed: 120 MPH.
 - c. Importance Factor: $I_w = 1.15$.
 - d. Exposure Category: C.
 - 2. Design Snow Loads: 35 psf.
 - 3. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
 - 4. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- C. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
 - 1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
 - 2. For laminated-glass lites, properties are based on products of construction indicated.
 - 3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
 - 4. U-Factors: Center-of-glazing values, in accordance with NFRC 100 and based on LBL's WINDOW 7 computer program, expressed as Btu/sq. ft. x h x deg F.
 - 5. SHGC and Visible Transmittance: Center-of-glazing values, in accordance with NFRC 200 and based on LBL's WINDOW 7 computer program.
 - 6. Visible Reflectance: Center-of-glazing values, in accordance with NFRC 300.

2.4 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than thickness indicated.
 1. Minimum Glass Thickness for Exterior Lites: 6 mm.
- E. Strength: Where fully tempered float glass is indicated, provide fully tempered float glass.

2.5 GLASS PRODUCTS

- A. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.6 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified in accordance with ASTM E2190.
 1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
 2. Perimeter Spacer: Manufacturer's standard spacer material and construction
 3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.7 GLAZING SEALANTS

- A. General:
 1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range of industry colors.

2.8 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:
 1. AAMA 804.3 tape.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
 1. AAMA 810.1, Type 1, for glazing applications in which tape acts as primary sealant.
 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.9 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, recommended in writing by manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks:
 1. Type recommended in writing by sealant or glass manufacturer.
- D. Spacers:
 1. Type recommended in writing by sealant or glass manufacturer.
- E. Edge Blocks:
 1. Type recommended in writing by sealant or glass manufacturer.
- F. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.10 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
 - 1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
 - a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - 2. Presence and functioning of weep systems.
 - 3. Minimum required face and edge clearances.
 - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches.
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide 1/8-inch-minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and in accordance with requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended in writing by gasket manufacturer.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION

- A. Immediately after installation, remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.8 MONOLITHIC GLASS SCHEDULE

- A. Clear Glass Type : At interior glazing at windows and doors Fully tempered float glass.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Guardian Glass; SunGuard.
 - b. Oldcastle Building Envelope.
 - c. Pilkington North America.
 - d. Saint-Gobain Glass Exprover NA.
 - e. Vitro Architectural Glass
 - 2. Minimum Thickness: 6 mm.
 - 3. Safety glazing required.

3.9 INSULATING GLASS SCHEDULE

- A. Low-E, Clear Insulating Glass Type: At exterior aluminum doors and framing and interior vestibule doors and framing.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Guardian Glass; SunGuard.
 - b. Oldcastle Building Envelope.
 - c. Pilkington North America.
 - d. Saint-Gobain Glass Exprover NA.
 - e. Vitro Architectural Glass
2. Overall Unit Thickness: 1 inch.
3. Minimum Thickness of Each Glass Lite: 6 mm>.
4. Outdoor Lite: Fully tempered float glass.
5. Interspace Content: Argon.
6. Indoor Lite: Fully tempered float glass.
7. Coating: Low E
8. Winter Nighttime U-Factor: 0.29 maximum.
9. Summer Daytime U-Factor: 0.27 maximum.
10. Safety glazing required.

END OF SECTION 088000

SECTION 089119 - FIXED LOUVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Fixed aluminum louvers.
- 2. Fixed Aluminum Penthouse Exhaust Units with Curbs

- B. Related Requirements:

- 1. Section 017419 - Construction and Demolition Waste Management and Disposal
- 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
- 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
- 4. Section 233300 "Air Duct Accessories"
- 5. Section 233100 "HVAC Ducts and Casings".
- 6. Section 233400 "HVAC Fans".

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification

1.4 DEFINITIONS

- A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.
- B. Horizontal Louver: Louver with horizontal blades (i.e., the axis of the blades are horizontal).
- C. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.
- D. Wind-Driven-Rain-Resistant Louver: Louver that provides specified wind-driven-rain performance, as determined by testing according to AMCA 500-L.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.
- B. Sustainable Design Submittals:
 - 1. LEEDv4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.
 - 1. Show weep paths, gaskets, flashings, sealants, and other means of preventing water intrusion.
 - 2. Show mullion profiles and locations.
- D. Samples: For each type of metal finish required.
- E. Delegated-Design Submittal: For louvers indicated to comply with structural and seismic performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver and showing compliance with performance requirements specified.

- B. Windborne-debris-impact-resistance test reports.
- C. Sample Warranties: For manufacturer's special warranties.

1.7 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.9 WARRANTY

- A. Special Finish Warranty: Manufacturer agrees to repair or replace components on which finishes fail in materials or workmanship within specified warranty period.
 - 1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 MANUFACTURERS

- A. Source Limitations: Obtain fixed louvers from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

2.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design louvers, including comprehensive engineering analysis by a qualified professional engineer, using structural performance requirements and design criteria indicated.
- B. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver-blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.
 - 1. Wind Loads: Determine loads based on pressures as indicated on Drawings.
- C. Seismic Performance: As indicated on drawings.
- D. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- F. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

2.4 FIXED EXTRUDED-ALUMINUM LOUVERS

- A. Horizontal Drainable-Blade Louver:
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Airolite Company, LLC (The); K638HP.
 - b. Arrow United Industries; EA-425-DD.
 - c. Greenheck Fan Corporation; ESD-403.
 - d. Ruskin Company; ELF375DX.
 - 2. Louver Depth: 4 inches.
 - 3. Frame and Blade Nominal Thickness: Not less than 0.080 inch for blades and 0.080 inch for frames.
 - 4. Mullion Type: Exposed.
 - 5. Louver Performance Ratings:
 - a. Free Area: Not less than 8.0 sq. ft. for 48-inch-wide by 48-inch-high louver.
 - b. Point of Beginning Water Penetration: Not less than 900 fpm.

- c. Air Performance: Not more than 0.15-inch wg static pressure drop at 1000-fpm free-area exhaust and intake velocity.
- 6. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.5 PENHOUSE LOUVERS

- A. Horizontal Drainable-Blade Penthouse Louver: (At Trombe Wall Exhaust and Outside Air Hood at Mezzanine Roof)
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Airolite Company, LLC (The); K6746PD.
 - b. Arrow United Industries; SPH-22-F.
 - c. Greenheck Fan Corporation; ESD-635PD.
 - d. Ruskin Company; PHB
 - 2. Louver Depth: 4 inches.
 - 3. Frame and Blade Nominal Thickness: Not less than 0.080 inch for blades and 0.125 inch for frames.
 - 4. Mullion Type: Boxed, exposed.
 - 5. Louver Performance Ratings:
 - a. Free Area: Not less than 58%.
 - b. Point of Beginning Water Penetration: Not less than 1,000 fpm.
 - c. Air Performance: Not more than 0.15-inch wg static pressure drop at 1000-fpm free-area exhaust velocity.
 - 6. AMCA Seal: Mark units with AMCA Certified Ratings Seal.
 - 7. Curb: Provide manufacturer's standard insulated curb with finish to match penthouse louver. Curb to be self-flashing with nailing flanges.

2.6 LOUVER SCREENS

- A. General: Provide screen at each exterior louver and penthouse louver.
 - 1. Screen Location for Fixed Louvers: Interior face.
 - 2. Screening Type:
 - a. Fixed drainable Louvers: Bird screening.
 - b. Penthouse Louver at Mechanical Mezzanine: Bird Screening
 - c. Penthouse Louvers at Trombe Wall: Bird Screening and Insect Screening
- B. Secure screen frames to louver frames with stainless-steel machine screw, spaced a maximum of 6 inches from each corner and at 12 inches o.c.

- C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.
 - 1. Metal: Same type and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips.
 - 2. Finish: Same finish as louver frames to which louver screens are attached.
 - 3. Type: Rewirable frames with a driven spline or insert.
- D. Louver Screening for Aluminum Louvers:
 - 1. Bird Screening: Aluminum, 1/2-inch-square mesh, 0.063-inch wire.
 - 2. Insect Screening: Aluminum, 18-by-16 mesh, 0.012-inch wire.

2.7 MATERIALS

- A. Aluminum Extrusions: ASTM B221, Alloy 6063-T5, T-52, or T6.
- B. Aluminum Sheet: ASTM B209, Alloy 3003 or 5005, with temper as required for forming, or as otherwise recommended by metal producer for required finish.
- C. Fasteners: Use types and sizes to suit unit installation conditions.
 - 1. Use hex-head or Phillips pan-head screws for exposed fasteners unless otherwise indicated.
 - 2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
 - 3. For color-finished louvers, use fasteners with heads that match color of louvers.
- D. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, fabricated from stainless-steel components, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing according to ASTM E488/E488M conducted by a qualified testing agency.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- F. Recycled Content of Aluminum Components: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.
- G. Regional Materials: Products shall be manufactured within 100 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project site.

2.8 FABRICATION

- A. Factory assemble louvers to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

- B. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.
- C. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
 - 1. Frame Type: Channel unless otherwise indicated.
- D. Include supports, anchorages, and accessories required for complete assembly.
- E. Provide vertical mullions of type and at spacings indicated, but not more than is recommended by manufacturer, or 72 inches o.c., whichever is less.
 - 1. Exposed Mullions: Where indicated, provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and handling limitations, provide interlocking split mullions designed to permit expansion and contraction.
- F. Provide subsills made of same material as louvers with extended sills for recessed louvers.
- G. Join frame members to each other and to fixed louver blades with fillet welds concealed from view or threaded fasteners, or both, as standard with louver manufacturer unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.9 ALUMINUM FINISHES

- A. Finish louvers after assembly.
- B. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

- A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.
- D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- E. Protect unpainted nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.
- F. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 079200 "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

- A. Clean exposed louver surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.
- B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- C. Restore louvers damaged during installation and construction, so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.
 - 1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 089119

SECTION 092116 - GYPSUM BOARD SHAFT WALL ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Gypsum board shaft wall assemblies.

- B. Related Requirements:

- 1. Section 017419 - Construction and Demolition Waste Management and Disposal
 - 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
 - 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 ACTION SUBMITTALS

- A. Product Data: For each component of gypsum board shaft wall assembly.

- B. Sustainable Design Submittals:

- 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and

contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and support them on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Comply with gypsum-shaftliner-board manufacturer's written instructions.
- B. Do not install finish panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, or mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2–PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.

2.3 GYPSUM BOARD SHAFT WALL ASSEMBLIES

- A. Fire-Resistance Rating: 1 hour.
- B. Gypsum Shaftliner Board:

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1. Moisture- and Mold-Resistant Type X: ASTM C1396/C1396M; manufacturer's proprietary fire-resistive liner panels with ASTM D3273 mold-resistance score of 10 as rated according to ASTM D3274, 1 inch thick, and with double beveled long edges.
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1) CertainTeed Corporation.
 - 2) National Gypsum Company.
 - 3) USG Corporation.
 - C. Non-Load-Bearing Steel Framing, General: Complying with ASTM C645 requirements for metal unless otherwise indicated and complying with requirements for fire-resistance-rated assembly indicated.
 1. Protective Coating: Coating with equivalent corrosion resistance of ASTM A653/A653M, G40 unless otherwise indicated.
 - D. Studs: Manufacturer's standard profile for repetitive, corner, and end members as follows:
 1. Depth: 2 ½ -inch C-H.
 2. Minimum Base-Metal Thickness: 25 gauge.
 - E. Runner Tracks: Manufacturer's standard J-profile track with manufacturer's standard long-leg length, but at least 2 inches long and matching studs in depth.
 1. Minimum Base-Metal Thickness: 25 gauge.
 - F. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. ClarkDietrich.
 - b. Fire Trak Corp.
 - c. GCP Applied Technologies Inc.
 - G. Finish Panels: Gypsum board as specified in Section 092900 "Gypsum Board."
- 2.4 AUXILIARY MATERIALS
- A. Provide auxiliary materials that comply with shaft wall manufacturer's written instructions.

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- B. Trim Accessories: Cornerbead, edge trim, and control joints of material and shapes as specified in Section 092900 "Gypsum Board" that comply with gypsum board shaft wall assembly manufacturer's written instructions for application indicated.
 - C. Steel Drill Screws: ASTM C1002 unless otherwise indicated.
 - D. Track Fasteners: Power-driven fasteners of size and material required to withstand loading conditions imposed on shaft wall assemblies without exceeding allowable design stress of track, fasteners, or structural substrates in which anchors are embedded.
 - 1. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to 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.
 - 2. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E1190 conducted by a qualified testing agency.
 - E. Reinforcing: Galvanized-steel reinforcing strips with 0.033-inch minimum thickness of base metal (uncoated).
 - F. Acoustical Sealant: Section 079219 "Acoustical Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install gypsum board shaft wall assemblies to comply with requirements of fire-resistance-rated assemblies indicated and manufacturer's written installation instructions.
- B. Do not bridge building expansion joints with shaft wall assemblies; frame both sides of expansion joints with furring and other support.
- C. Install supplementary framing in gypsum board shaft wall assemblies around openings and as required for blocking, bracing, and support of gravity and pullout loads of fixtures, equipment,

services, heavy trim, furnishings, wall-mounted door stops, and similar items that cannot be supported directly by shaft wall assembly framing.

1. Reinforcing: Provide where items attach directly to shaft wall assembly as indicated on Drawings; accurately position and secure behind at least one layer of face panel.
- D. Penetrations: At penetrations in shaft wall, maintain fire-resistance rating of shaft wall assembly by installing supplementary steel framing around perimeter of penetration and fire protection behind boxes containing wiring devices, elevator call buttons and floor indicators, and similar items.
- E. Isolate perimeter of gypsum panels from building structure to prevent cracking of panels while maintaining continuity of fire-rated construction.
- F. Firestop Tracks: Install to maintain continuity of fire-resistance-rated assembly indicated.
- G. Control Joints: Install control joints according to ASTM C840 and in specific locations approved by Architect while maintaining fire-resistance rating of gypsum board shaft wall assemblies.
- H. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.3 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, or mold damaged.
 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092116

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SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Non-load-bearing steel framing systems for interior partitions.
2. Suspension systems for interior ceilings and soffits.
3. Grid suspension systems for gypsum board ceilings.

- B. Related Requirements:

1. Section 017419 - Construction and Demolition Waste Management and Disposal
2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
4. Section 054000 "Cold-Formed Metal Framing" for exterior soffit framing.
5. Section 092116 "Gypsum Board Shaftwall Assemblies" for metal framing as part of shaftwalls.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of code-compliance certification for studs and tracks.
- B. Evaluation Reports: For post-installed anchors and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

1.6 QUALITY ASSURANCE

- A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association or the Steel Stud Manufacturers Association.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2–PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E119 by an independent testing agency.
- B. Horizontal Deflection: For wall assemblies, limited to 1/360 of the wall height based on horizontal loading of 5 lbf/sq. ft.

2.3 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C754 for conditions indicated.
 1. Steel Sheet Components: Comply with ASTM C645 requirements for steel unless otherwise indicated.

2. Protective Coating: Coating with equivalent corrosion resistance of ASTM A653/A653M, G40, hot-dip galvanized unless otherwise indicated.
- B. Studs and Tracks: ASTM C645. Use either conventional steel studs and tracks or embossed, high-strength steel studs and tracks.
1. Steel Studs and Tracks:
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1) ClarkDietrich.
 - 2) MarinoWARE.
 - 3) SCAFCO Steel Stud Company.
 - b. Minimum Base-Steel Thickness: 0.0329 inch.
 - c. Depth: As indicated on Drawings.
- C. Slip-Type Head Joints: Where indicated, provide one of the following:
1. Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to tracks while allowing 1-1/2-inch minimum vertical movement.
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1) ClarkDietrich.
 - 2) MarinoWARE.
 - 3) SCAFCO Steel Stud Company.
 2. Single Long-Leg Track System: ASTM C645 top track with 2-inch-deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
 3. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1) ClarkDietrich.
 - 2) MarinoWARE.
 - 3) SCAFCO Steel Stud Company.

- D. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. ClarkDietrich.
 - b. MarinoWARE.
 - c. SCAFCO Steel Stud Company.
 2. Minimum Base-Steel Thickness: 0.0329 inch.
- E. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-steel thickness, with minimum 1/2-inch-wide flanges.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. ClarkDietrich.
 - b. MarinoWARE.
 - c. SCAFCO Steel Stud Company.
 2. Depth: 1-1/2 inches.
 3. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel.
- F. Hat-Shaped, Rigid Furring Channels: ASTM C645.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. ClarkDietrich.
 - b. MarinoWARE.
 - c. SCAFCO Steel Stud Company.
 2. Minimum Base-Steel Thickness: 0.0329 inch.
 3. Depth: 7/8 inch.

2.4 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.
- B. Hanger Attachments to Concrete:

1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 (mechanical anchors in concrete) or AC308 (adhesive anchors in concrete) as appropriate for the substrate.
 - a. Uses: Securing hangers to structure.
 - b. Type: Torque-controlled, expansion anchor, torque-controlled, adhesive anchor or adhesive anchor.
 - c. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941, Class Fe/Zn 5, unless otherwise indicated.
 2. Power-Actuated Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
 3. All anchors to be installed in apex of slab form and to a maximum embedment depth necessary to avoid conflict with embedded piping.
- C. Wire Hangers: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
- D. Flat Hangers: Steel sheet, 1 by 3/16 inch by length indicated.
- E. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-steel thickness of 0.0538 inch and minimum 1/2-inch-wide flanges.
1. Depth: 1-1/2 inches, unless otherwise indicated..
- F. Furring Channels (Furring Members):
1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.
 2. Steel Studs and Tracks: ASTM C645.
 - a. Minimum Base-Steel Thickness: 0.0329 inch.
 - b. Depth: As indicated on Drawings, or if not indicated 2 1/2-inch.
 3. Embossed, High-Strength Steel Studs and Tracks: ASTM C645.
 - a. Minimum Base-Steel Thickness: 0.0329 inch.
 - b. Depth: As indicated on Drawings, or if not indicated 2 1/2-inch.
 4. Hat-Shaped, Rigid Furring Channels: ASTM C645, 7/8 inch deep.
 - a. Minimum Base-Steel Thickness: 0.0329 inch.
 5. Resilient Furring Channels: 1/2-inch-deep members designed to reduce sound transmission.
 - a. Configuration: hat shaped.
- G. Grid Suspension System for Gypsum Board Ceilings: ASTM C645, direct-hung system composed of main beams and cross-furring members that interlock.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Armstrong Ceiling & Wall Solutions.
 - b. Rockfon (Rockwool International).
 - c. USG Corporation.

2.5 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
 1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide one of the following:
 1. Asphalt-Saturated Organic Felt: ASTM D226/D226M, Type I (No. 15 asphalt felt), nonperforated.
 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.
- B. Coordination with Sprayed Cellulose Insulation Materials:
 1. Before sprayed cellulose insulation materials are applied, attach offset anchor plates or ceiling tracks to surfaces indicated to receive sprayed cellulose insulation materials.

Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.

2. After sprayed cellulose insulation materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of insulation materials below that indicated. Protect adjacent insulation materials from damage.

3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C754.
 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.

- b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
- 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 - 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
- E. Direct Furring:
- 1. Screw to substrate.
 - 2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
- F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.5 INSTALLING CEILING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- 1. Hangers: 48 inches o.c.
 - 2. Carrying Channels (Main Runners): 48 inches o.c.
 - 3. Furring Channels (Furring Members): 16 inches o.c.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
- 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

- a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 5. Do not attach hangers to steel roof deck.
 6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.
- F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- G. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

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SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Interior gypsum board.

- B. Related Requirements:

- 1. Section Section 017419 - Construction and Demolition Waste Management and Disposal
 - 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
 - 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
 - 4. 092116 "Gypsum Board Shaft Wall Assemblies" for metal shaft-wall framing, gypsum shaft liners, and other components of shaft-wall assemblies.
 - 5. Section 092216 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:

1. Mold-resistant gypsum board, Type X
2. Interior trim.
3. Joint treatment materials.
4. Laminating adhesive.
5. Sound-attenuation blankets.
6. Acoustical sealant.

B. Sustainable Design Submittals:

1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.

1.5 QUALITY ASSURANCE

A. Mockups: Build mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Build mockups for the following:
 - a. Each level of gypsum board finish indicated for use in exposed locations.
 - b. Each texture finish indicated.
2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.

2.3 GYPSUM BOARD, GENERAL

- A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.
- B. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.4 INTERIOR GYPSUM BOARD

- A. Mold-Resistant Gypsum Board: At all areas except Toilet Rooms, Janitor's Rooms and Mechanical Rooms, provide ASTM C1396/C1396M with moisture- and mold-resistant core and paper surfaces.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. American Gypsum.
 - b. National Gypsum Company.
 - c. USG Corporation.
 2. Core: 5/8 inch, Type X.
 3. Long Edges: Tapered.
 4. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

- B. High-Abuse Mold-Resistant Gypsum Board: At Toilet Rooms, Janitor's Rooms, Garage and Mechanical Rooms, provide ASTM C1396/C1396M high abuse with moisture- and mold-resistant core and paper surfaces.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. American Gypsum.
 - b. National Gypsum Company.
 - c. USG Corporation.
 2. Assembly High-impact 5/8 inch, Mold Resistant Type X, with Glass Mat Skin
 3. Long Edges: Tapered.
 4. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.5 TRIM ACCESSORIES

- A. Interior Trim: ASTM C1047.
1. Material: Galvanized, aluminum-coated steel sheet or paper-faced galvanized-steel sheet.
 2. Shapes:
 - a. Cornerbead.
 - b. U -Bead: J-shaped; exposed short flange does not receive joint compound.
 - c. Expansion (control) joint.

2.6 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C475/C475M.
- B. Joint Tape:
1. Interior Gypsum Board: Paper.
- C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
1. Prefilling: At open joints at beveled panel edges, and damaged surface areas, use setting-type taping compound.
 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping or drying-type, all-purpose compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 3. Fill Coat: For second coat, use setting-type, sandable topping or drying-type, all-purpose compound.

4. Finish Coat: For third coat, use setting-type, sandable topping or drying-type, all-purpose compound.

2.7 AUXILIARY MATERIALS

- A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
- C. Steel Drill Screws: ASTM C1002 unless otherwise indicated.
 1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- E. Acoustical Sealant:
 1. Manufacturer's standard sealant.
- F. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."
- G. Vapor Retarder: As specified in Section 072600 "Vapor Retarders."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION AND FINISHING OF PANELS, GENERAL

- A. Comply with ASTM C840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Mold-Resistant Type: All locations indicated to have gypsum board.
- B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
 3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.4 INSTALLATION OF TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
 1. Cornerbead: Use at outside corners.
 2. U-(J) Bead: Use at exposed panel edges.

3.5 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints at beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:
 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 2. Level 2: Panels that are substrate for wood paneling.
 3. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated

- a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."

3.6 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:

- 1. Acoustical panels and exposed suspension systems for interior ceilings.
- 2. Perimeter-trimmed acoustical panels and exposed suspension systems for interior ceilings
- 3. Suspended acoustical canopies with cable suspension system

- B. Related Requirements:

- 1. Section 017419 - Construction and Demolition Waste Management and Disposal
- 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
- 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.

- C. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Samples: For each exposed product and for each color and texture specified, 6 inches in size.
- D. Samples for Initial Selection: For components with factory-applied finishes.
- E. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:
 - 1. Acoustical Panels: Set of 6-inch-square samples of each type, color, pattern, and texture.
 - 2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch-long samples of each type, finish, and color.
 - 3. Perimeter Trim: Set of 6-inch-long samples of each type, finish, and color.
 - 4. Acoustical Canopy: 12-inch square with suspension attachment, edge condition and hardware.

1.6 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Ceiling suspension-system members.
 - 2. Structural members to which suspension systems will be attached.
 - 3. Method of attaching hangers to building structure.
 - a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
 - 4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
 - 5. Size and location of initial access modules for acoustical panels.
 - 6. Items penetrating finished ceiling and ceiling-mounted items including the following:
 - a. Lighting fixtures.
 - b. Diffusers.
 - c. Grilles.
 - d. Sprinklers.
 - e. Perimeter moldings.
 - f. Suspended panels

7. Minimum Drawing Scale: 1/4 inch = 1 foot.

B. Qualification Data: For testing agency.

C. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency.

D. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.

E. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.

1.9 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockup of typical ceiling area as directed by the Architect.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.11 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 MANUFACTURERS

- A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.3 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- B. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Class A according to ASTM E1264.
 - 2. Smoke-Developed Index: 50 or less.

2.4 ACOUSTICAL PANELS: ACT Type 1

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong Ceiling & Wall Solutions; Ultima, High NRC or a comparable product by one of the following:
 - 1. CertainTeed Corporation.
 - 2. USG Corporation.
- B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
- C. Classification: Provide panels as follows:

1. Type and Form: Type IV, mineral base with membrane-faced overlay; Form 2, water felted; with acoustically transparent membrane.
 2. Pattern: E (lightly textured).
- D. Color: White .
- E. Light Reflectance (LR): Not less 0.90.
- F. Ceiling Attenuation Class (CAC): Not less than 35.
- G. Noise Reduction Coefficient (NRC): Not less 0.80.
- H. Articulation Class (AC): Not less than 170.
- I. Edge/Joint Detail: Square.
- J. Thickness: 7/8 inch.
- K. Modular Size: 24 by 24 inches.
- L. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D3273, ASTM D3274, or ASTM G21 and evaluated according to ASTM D3274 or ASTM G21.

2.5 ACOUSTICAL PANELS: ACT Type 2

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong Ceiling & Wall Solutions; Cortega or a comparable product by one of the following:
1. CertainTeed Corporation.
 2. USG Corporation.
- B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
- C. Classification: Provide panels as follows:
1. Type and Form: Type III, mineral base with painted finish; Form 2, water felted.
 2. Pattern: CD (perforated, small holes and fissured) .
- D. Color: White .
- E. Light Reflectance (LR): Not less 0.82.
- F. Ceiling Attenuation Class (CAC): Not less than 33.
- G. Noise Reduction Coefficient (NRC): Not less 0.55.

- H. Edge/Joint Detail: Square.
- I. Thickness: 5/8 inch.
- J. Modular Size: 24 by 24 inches.
- K. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D3273, ASTM D3274, or ASTM G21 and evaluated according to ASTM D3274 or ASTM G21.

2.6 METAL SUSPENSION SYSTEM

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong Ceiling & Wall Solutions ; Prelude XL. or a comparable product by one of the following:
 - 1. CertainTeed Corporation.
 - 2. USG Corporation.
- B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C635/C635M and designated by type, structural classification, and finish indicated.
- C. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 15/16-inch-wide metal caps on flanges.
 - 1. Structural Classification: Intermediate-duty system.
 - 2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
 - 3. Face Design: Flat, flush.
 - 4. Cap Material: Cold-rolled steel.
 - 5. Cap Finish: Painted white.

2.7 METAL PERIMETER TRIM

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong Ceiling & Wall Solutions ; Axiom Classic Trim, or a comparable product by one of the following:
 - 1. CertainTeed Corporation.
 - 2. USG Corporation.
- B. Extruded Aluminum Perimeter Trim:
 - 1. Face Design: Extruded aluminum.
 - 2. Size: 3/4" x 2".
 - 3. Finish: Painted white.

2.8 ACOUSTICAL CANOPIES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong Ceiling & Wall Solutions ; Soundscapes, Model 6259; or a comparable product by one of the following:
1. CertainTeed Corporation.
 2. USG Corporation.
- B. Valley Canopy:
1. Material: Mineral Fiber, pre-formed in canopy shape.
 2. Size: 46 ½" x 75" x 1 ¼"
 3. Panel Arc: 10'-9" radius
 4. Suspension: Provide manufacturer's standard kit, inclusive of embedded, flush-mounted hardware system and aircraft cable. Provide all hardware and attachment components required for a complete installation.
 5. Finish: White.
 6. Acoustical Performance: 30 Sabin per panel using ASTM C423.
 7. Fire Performance: Class A

2.9 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
1. Anchors in Concrete: Coordinate placement and embedment depth to avoid damage to piping embedded in slab.
 2. Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E488/E488M or ASTM E1512 as applicable, conducted by a qualified testing and inspecting agency.
 - a. Type: Postinstalled expansion or Postinstalled bonded anchors.
 - b. Corrosion Protection: Carbon-steel components zinc plated according to ASTM B633, Class SC 1 (mild) service condition.
 3. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E1190, conducted by a qualified testing and inspecting agency.
- B. Wire Hangers, Braces, and Ties: Provide wires as follows for suspended grid system:
1. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.

2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch-diameter wire.

- C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
- D. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
- E. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized-steel sheet complying with ASTM A653/A653M, G90 coating designation; with bolted connections and 5/16-inch-diameter bolts.
- F. Impact Clips: Manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels.
- G. Seismic Clips: Manufacturer's standard seismic clips designed to secure acoustical panels in place during a seismic event.
- H. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.
- I. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.

2.10 METAL EDGE MOLDINGS AND TRIM

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong World Industries, Inc; Prelude XL or a comparable product by one of the following:
 - 1. CertainTeed Corporation.
 - 2. USG Corporation.
- B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
 - 1. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
 - 2. For circular penetrations of ceiling, where an escutcheon is not provided, provide edge moldings fabricated to diameter required to fit penetration exactly.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.
- B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION

- A. Install acoustical panel ceilings and canopies according to ASTM C636/C636M, seismic design requirements, and manufacturer's written instructions.
- B. Suspend ceiling hangers from building's structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 - 4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 - 5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger

- involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 7. When structure does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 8. Do not attach hangers to steel deck tabs.
 9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
1. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
 3. Install impact clips in panels penetrated by sprinkler heads; space according to panel manufacturer's written instructions unless otherwise indicated.
 4. Protect lighting fixtures and air ducts according to requirements indicated for fire-resistance-rated assembly.

3.4 ERECTION TOLERANCES

- A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.
- B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections.
- B. Perform the following tests and inspections of completed installations of acoustical panel ceiling hangers and anchors and fasteners in successive stages and when installation of ceiling suspension systems on each floor has reached 20 percent completion, but no panels have been installed. Do not proceed with installations of acoustical panel ceiling hangers for the next area until test results for previously completed installations of acoustical panel ceiling hangers show compliance with requirements.
 - 1. Within each test area, testing agency will select one of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 200 lbf of tension; it will also select one of every two postinstalled anchors used to attach bracing wires to concrete and will test them for 440 lbf of tension.
 - 2. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.
- C. Acoustical panel ceiling hangers, anchors, and fasteners will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.6 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

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SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Thermoset-rubber base.
- 2. Rubber molding accessories.

- B. Related Requirements:

- 1. Section 017419 - Construction and Demolition Waste Management and Disposal
- 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
- 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
- 4. Section 096813 "Tile Carpeting"

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:

1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Samples: For each exposed product and for each color and texture specified, not less than 12 inches long.
- D. Samples for Initial Selection: For each type of product indicated.
- E. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches long.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.6 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 1. Coordinate mockups in this Section with mockups specified in other Sections.
 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.8 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following periods:
 1. 48 hours before installation.

2. During installation.
 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 THERMOSET-RUBBER BASE

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. Burke Mercer Flooring Products; a division of Burke Industries Inc.
 2. Johnsonite; a Tarkett company.
 3. Roppe Corporation, USA.
- B. Product Standard: ASTM F1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
1. Style and Location:
 - a. Style B, Cove: Provide in areas scheduled to receive rubber base.
- C. Thickness: 0.125 inch.
- D. Height: 4 inches.
- E. Lengths: Coils in manufacturer's standard length.
- F. Outside Corners: Preformed.
- G. Inside Corners: Preformed.
- H. Colors: As selected from manufacturer's full range of options.

2.3 RUBBER MOLDING ACCESSORY

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Burke Mercer Flooring Products; a division of Burke Industries Inc.
 - 2. Johnsonite; a Tarkett company.
 - 3. Roppe Corporation, USA.
- B. Description: Rubber transition strips, carpet to polished concrete.
- C. Profile and Dimensions: HCA beveled.
- D. Locations: Provide rubber molding accessories in areas where carpet meets polished concrete.
- E. Colors and Patterns: As selected from manufacturer's full range of options.

2.4 INSTALLATION MATERIALS

- A. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates for Transition Strips: Prepare horizontal surfaces according to ASTM F710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

-
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
 4. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
 - b. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient products until materials are the same temperature as space where they are to be installed.
1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
 - 1. Remove adhesive and other blemishes from surfaces.
 - 2. Sweep and vacuum horizontal surfaces thoroughly.
 - 3. Damp-mop horizontal surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Modular carpet tile.

B. Related Requirements:

1. Section 017419 - Construction and Demolition Waste Management and Disposal
2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
4. Section 064023 "Interior Architectural Woodwork" for wood base.
5. Section 096513 "Resilient Base and Accessories" for transition strips.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- C. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
2. Include manufacturer's written installation recommendations for each type of substrate.

B. Sustainable Design Submittals:

1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.

C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch-long Samples.

D. Samples for Initial Selection: For each type of carpet tile.

1. Include Samples of exposed edge, transition, and other accessory stripping involving color or finish selection.

E. Samples for Verification: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch-long Samples.

F. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

G. Sustainable Product Certification: Provide ANSI/NSF 140 certification for carpet products.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.
- C. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:

1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.

2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd..

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 1. Build mockups at an office as directed by Architect.
 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Comply with the Carpet and Rug Institute's CRI 104.

1.10 FIELD CONDITIONS

- A. Comply with the Carpet and Rug Institute's CRI 104 for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.11 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
 - 2. Failures include, but are not limited to, the following:
 - a. More than 10 percent edge raveling, snags, and runs.
 - b. Dimensional instability.
 - c. Excess static discharge.
 - d. Loss of tuft-bind strength.
 - e. Loss of face fiber.
 - f. Delamination.
 - 3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 CARPET TILE

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Interface, LLC; Product “Farmland”; Collection “Biodiversity”; or a comparable product by one of the following:
 - 1. Mannington Mills, Inc., Poetica Collection.
 - 2. Shaw Contract Group; a Berkshire Hathaway company, Riche Tile
- B. Color: 106241 Dove.
- C. Fiber Content: Post consumer content nylon.
- D. Pile Characteristic: Tufted Cut-and-loop pile.
- E. Tufted Yarn Weight: 20 oz/square yard.
- F. Density: 6,000 oz./cu. yd..
- G. Pile Thickness: 0.12 in. for finished carpet tile according to ASTM D6859.

- H. Stitches: 10 stitches per inch.
- I. Gage: 5/64 in.
- J. Primary Backing/Backcoating: Basis of Design, "Glasbac".
- K. Size: 50 cm x 50 cm.
- L. Applied Treatments:
 - 1. Soil-Resistance Treatment: Manufacturer's standard treatment.
 - 2. Antimicrobial Treatment: Manufacturer's standard treatment that protects carpet tiles as follows:
 - a. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria, not less than 1-mm halo of inhibition for gram-negative bacteria, and no fungal growth, according to AATCC 174.
- M. Performance Characteristics:
 - 1. Appearance Retention Rating: Moderate traffic, 2.5 minimum according to ASTM D7330.
 - 2. Radiant Panel (ASTM E-648): Class 1.
 - 3. Smoke Density: <450

2.3 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.
- C. Transition Strips: Refer to Section 096513 "Resilient Base and Accessories".

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.
- B. Examine carpet tile for type, color, pattern, and potential defects.

- C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.
 - 1. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
 - b. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
 - c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with the Carpet and Rug Institute's CRI 104 and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. General: Comply with the Carpet and Rug Institute's CRI 104, Section 10, "Carpet Tile," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: Partial adhered installation. Basis of Design is Interface "TacTiles" Connectors.
 - 1. Provide minimum 4 TacTiles per square yard of carpet

2. Lay anchor rows, placing tactile connector at every joint. Install carpet using a step method placing tactile connector at every corner.
 3. Install in strict accordance with manufacturer's written instructions
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Maintain pile-direction patterns: Quarter Turn.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 2. Remove yarns that protrude from carpet tile surface.
 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with the Carpet and Rug Institute's CRI 104, Section 13.7.
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

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SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems on interior substrates.
- B. Related Requirements:
 - 1. Section 017419 - Construction and Demolition Waste Management and Disposal
 - 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
 - 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
 - 4. Section 051200 "Structural Steel Framing" for shop priming structural steel.
 - 5. Section 055113 "Metal Pan Stairs" for shop priming metal pan stairs.
 - 6. Section 099300 "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on interior wood substrates.

1.3 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D523.
- B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.
- C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.
- D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523.
- E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523.
- F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523.
- G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D523.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
 - 2. Indicate VOC content.
- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Samples for Initial Selection: For each type of topcoat product.
- D. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Apply coats on Samples in steps to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- E. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paint: 2 gal. of each type and color in addition to any opened cans.

1.6 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
 - b. Other Items: Architect will designate items or areas required.
 - 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Benjamin Moore & Co, Regal Select, Premium Interior Paint and Primer
 - 2. PPG Architectural Coatings, Speedhide Pro EV Zero
 - 3. Sherwin-Williams Company (The), Harmony

2.3 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. Colors: As indicated in a color schedule.
 - 1. Thirty percent of surface area will be painted with deep tones.
- D. VOC Level: Zero

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Gypsum Board: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- E. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.
- F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
 1. Use applicators and techniques suited for paint and substrate indicated.
 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
1. Paint the following work where exposed in equipment rooms:
 - a. Equipment, including panelboards and switch gear.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory-applied final finishes.
 - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 2. Paint the following work where exposed in occupied spaces:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces. Paint a minimum of 24-inches or further if visible from occupied areas.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

- A. CMU Substrates:
 - 1. Latex System:
 - a. Block Filler: Block filler, latex, interior/exterior.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: Latex, interior, Eggshell.
- B. Steel Substrates:
 - 1. Latex over Shop-Applied Primer System MPI INT 5.1X:
 - a. Prime Coat: Primer compatible with shop primer. Touch-up as required.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: Latex, interior, semi-gloss.
- C. Copper Substrates: Do not Paint
- D. Stainless Steel Substrates: Do not Paint

- E. Wood Substrates: Refer to Section 099300 "Staining and Transparent Finishing" .
- F. Gypsum Board Substrates:
 - 1. Latex over Latex Sealer System:
 - a. Prime Coat: Primer sealer, latex, interior.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: Latex, interior, flat (MPI Gloss Level 1)[, MPI #53].
- G. Acoustic Panels and Tiles: Do not paint.
- H. Cotton or Canvas and ASJ Insulation-Covering Substrates: Including pipe and duct coverings.
 - 1. Latex System, MPI INT 10.1A:
 - a. Prime Coat: Primer sealer, latex, interior MPI #50.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: Latex, interior, flat (MPI Gloss Level 1), MPI #53.

END OF SECTION 099123

SECTION 099300 - STAINING AND TRANSPARENT FINISHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes surface preparation and application of wood stains and transparent finishes on the following substrates:

- 1. Exterior Substrates:

- a. Wood Planks at Railings
 - b. Wood Decking

- 2. Interior Substrates:

- a. Dressed lumber (finish carpentry or woodwork), including, but not limited to board paneling, board wainscot, running and standing trim.

- B. Related Requirements:

- 1. Section 017419 - Construction and Demolition Waste Management and Disposal
 - 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
 - 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
 - 4. Section 057300 "Decorative Metal Railings" for wood boards at exterior railings.
 - 5. Section 061800 "Glue-Laminated Construction" for factory finished wood structure.
 - 6. Section 064023 "Interior Architectural Woodwork" for interior wood products.
 - 7. Section 081416 "Flush Wood Doors" for factory finished wood doors.
 - 8. Section 085200 "Wood Windows" for factory finished wood windows.
 - 9. Section 099123 "Interior Painting" for stains and transparent finishes on concrete floors.

1.3 DEFINITIONS

- A. MPI Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D523.

- B. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523.
- C. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523.
- D. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523.
- E. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D523.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
 - 2. Indicate VOC content.
- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Samples for Initial Selection: For each type of product.
- D. Samples for Verification: For each type of finish system and in each color and gloss of finish required.
 - 1. Submit Samples on representative samples of actual wood substrates, 8 inches square or 8 inches long.
 - 2. Apply coats on Samples in steps to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.

- E. Product List: Cross-reference to finish system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Stains and Transparent Finishes: 2 gallons of each material and color applied.

1.6 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each finish system indicated and each color selected to verify preliminary selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each type of finish system and substrate.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
 - b. Other Items: Architect will designate items or areas required.
 - 2. Final approval of stain color selections will be based on mockups.
 - a. If preliminary stain color selections are not approved, apply additional mockups of additional stain colors selected by Architect at no added cost to Owner.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

- A. Apply finishes only when temperature of surfaces to be finished and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply finishes when relative humidity exceeds 85 percent, at temperatures less than 5 deg F above the dew point, or to damp or wet surfaces.
- C. Do not apply exterior finishes in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Cabot Stains.
 - 2. Benjamin Moore & Co.
 - 3. Sherwin-Williams Company (The).

2.3 MATERIALS, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products List."
- B. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- C. Stain Colors: Manufacturer's Standard Natural Clear Stain.

2.4 SOURCE QUALITY CONTROL

- A. Testing of Materials: Owner reserves the right to invoke the following procedure:
 - 1. Owner will engage the services of a qualified testing agency to sample wood finishing materials. Contractor will be notified in advance and may be present when samples are taken. If materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 - 2. Testing agency will perform tests for compliance with product requirements.
 - 3. Owner may direct Contractor to stop applying wood finishes if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying materials from Project site, pay for testing, and refinish surfaces finished with rejected materials. Contractor will be required to remove rejected materials from

previously finished surfaces before refinishing with complying materials if the two finishes are incompatible or produce results that, in the opinion of the Architect, are aesthetically unacceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Exterior Wood Substrates: 15 percent, when measured with an electronic moisture meter.
- C. Maximum Moisture Content of Interior Wood Substrates: 10 percent, when measured with an electronic moisture meter.
- D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- E. Proceed with finish application only after unsatisfactory conditions have been corrected.
 - 1. Beginning finish application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.
 - 1. After completing finishing operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each substrate condition and as specified.
 - 1. Remove dust, dirt, oil, and grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.
 - 2. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.
- D. Exterior Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying finish.
2. Prime edges, ends, faces, undersides, and backsides of wood.
 - a. For varnish-coated stained wood, stain edges and ends and prime with varnish. Prime undersides and backsides with varnish.
3. Countersink steel nails, if used, and fill with putty or plastic wood filler tinted to final color. Sand smooth when dried.

E. Interior Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying finish.
2. Apply wood filler paste to open-grain woods, as defined in "MPI Architectural Painting Specification Manual," to produce smooth, glasslike finish.
3. Sand surfaces exposed to view and dust off.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dry.

3.3 APPLICATION

- A. Apply finishes according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
1. Use applicators and techniques suited for finish and substrate indicated.
 2. Finish surfaces behind movable equipment and furniture same as similar exposed surfaces.
 3. Do not apply finishes over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing finish application, clean spattered surfaces. Remove spattered materials by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

3.5 EXTERIOR WOOD-FINISH-SYSTEM SCHEDULE

A. Wood Substrates: Wood Boards at Decorative Metal Railings.

1. Water-Based Varnish System MPI EXT 6.3M:
 - a. Prime Coat: Water-based varnish matching topcoat.
 - b. Intermediate Coat: Water-based varnish matching topcoat.
 - c. Topcoat: Water-based varnish (MPI Gloss Level 3), MPI #193.

B. Wood Substrates: Traffic surfaces including lumber decking.

1. Deck Stain over Wood Preservative System, MPI EXT 6.5D:
 - a. Preservative Coat: Preservative, for exterior wood, MPI #37.
 - b. Intermediate Coat: Stain, for exterior wood decks, matching topcoat.
 - c. Top coat: Stain, for exterior wood decks, MPI #33.

3.6 INTERIOR WOOD -FINISH-SYSTEM SCHEDULE

A. Wood Substrates: Wood trim, architectural woodwork, wood board paneling.

1. Water-Based Varnish System[MPI INT 6.3Q]:
 - a. Prime Coat: Water-based varnish matching topcoat.
 - b. Intermediate Coat: Water-based varnish matching topcoat.
 - c. Topcoat: Varnish, water based, clear, semi-gloss (MPI Gloss Level 5), MPI #129.

END OF SECTION 099300

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SECTION 101423 - PANEL SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Panel signs: Section includes panel signs for building identification and to communicate sustainability initiatives utilized to achieve LEED Certification and Net Zero Energy. Graphics and text will be developed and provided by the Architect and Owner. The sign schedule in part 3 generally describes the signs for use by the Contractor for bidding.

- B. Related Requirements:

- 1. Section 017419 - Construction and Demolition Waste Management and Disposal
- 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
- 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
- 4. Section 101425 "Room-Identification Panel Signage" for room-identification signs that are directly attached to the building.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 COORDINATION

- A. Furnish templates for placement of sign-anchorage devices embedded in permanent construction by other installers.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Shop Drawings: For panel signs.
 - 1. Include fabrication and installation details and attachments to other work.
 - 2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
 - 3. Show message list, typestyles, graphic elements and layout for each sign at least half size.
- D. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.
 - 1. Include representative Samples of available typestyles and graphic symbols.
- E. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:
 - 1. Panel Signs: Not less than 12 inches square, including corner.
 - 2. Exposed Accessories: Full-size Sample of each accessory type.
- F. Product Schedule: For panel signs. Use same designations as specified.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and manufacturer.
- B. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For signs to include in maintenance manuals.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer of products or an entity that employs installers and supervisors who are trained and approved by manufacturer.

1.9 FIELD CONDITIONS

- A. Field Measurements: Verify locations of anchorage devices embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Deterioration of finishes beyond normal weathering.
 - b. Deterioration of embedded graphic image.
 - c. Separation or delamination of sheet materials and components.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. Thermal Movements: For exterior signs, allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- B. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

2.3 PANEL SIGNS

- A. Panel Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
1. Basis-of-Design Product: Subject to compliance with requirements, provide signs manufactured by Signs + Graph X, 2 Kirtland Street, Deep River, CT (860-526-3119) or a comparable product by one of the following:
 - a. One Look Sign Company, Centerbrook, CT
 - b. Giordano Signs, Torrington, CT
 2. Laminated Polycarbonate-Sheet Sign: Polycarbonate face sheet laminated to each side of phenolic base sheet to produce composite sheet.
 - a. Composite-Sheet Thickness: 0.25 inch.
 - b. Surface-Applied, Flat Graphics: Applied photo image.
 3. Sign-Panel Perimeter: Finish edges smooth.
 - a. Edge Condition: Square cut.
 - b. Corner Condition in Elevation: Square.
 4. Mounting:
 - a. Building Identification Signage (Sign Types 1-3): Stainless steel pin-mounted, 3/4" off face of building.
 - b. Sustainability Signs (Sign Types 4-8): Surface mounted to wall with countersunk flathead through fasteners.
 - c. Building Identification Signs (Garage): Surface mounted to wall with countersunk flathead through fasteners and spacers the depth of siding corrugation.
 5. Text and Typeface: Typeface matching Architect's sample.
 6. Flatness Tolerance: Sign shall remain flat or uniformly curved under installed conditions as indicated on Drawings and within a tolerance of plus or minus 1/16 inch measured diagonally from corner to corner.

2.4 PANEL-SIGN MATERIALS

- A. Polycarbonate Sheet: ASTM C1349, Appendix X1, Type II (coated, mar-resistant, UV-stabilized polycarbonate), with coating on both sides.
- B. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

2.5 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following unless otherwise indicated:
 - 1. Stainless-steel unless otherwise indicated.

2.6 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
 - 1. Preassemble signs in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
- B. Subsurface-Applied Graphics: Apply graphics to back face of clear face-sheet material to produce precisely formed image. Image shall be free of rough edges.

2.7 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in 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 contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.
- C. Verify that anchorage devices embedded in permanent construction are correctly sized and located to accommodate signs.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 LAYOUT and DESIGN

- A. Manufacturer shall work with the Architect and Owner to layout and design signs to ready them for printing. Architect will provide photo ready graphic files in .jpg or .pdf format. Text will be provided for content to be laid out by manufacturer.

3.3 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
 - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
 - 3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
- B. Mounting Methods:
 - 1. Through Fasteners: Drill holes in substrate using predrilled holes in sign as template. Countersink holes in sign if required. Place sign in position and flush to surface. Install through fasteners and tighten.

3.4 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

3.5 PANEL SIGN SCHEULE

- A. Panel Sign 01: Building Identification Sign – (Two Required)
 - 1. Overall Size: 4-feet wide x 1'-6" high
 - 2. Location: Exterior Wall Mounted above Doors A15 and A-26
 - 3. Message: "CT DEEP West District Headquarters" with DEEP Logo.

- B. Panel Sign 02: Building Identification Sign
1. Overall Size: 1-foot wide x 1'-0" high
 2. Location: Exterior Wall Mounted adjacent to Door A15
 3. Message: "Staff Entrance" with DEEP Logo.
- C. Panel Sign 03: Building Identification Sign
1. Overall Size: 1'-6" wide x 2-feet high
 2. Location: Exterior Wall Mounted adjacent to Door A1
 3. Message: "CT DEEP Environmental Conservation Police" with DEEP Logo.
- D. Panel Sign 04: General Building Description of LEED Certification and Net Zero Energy
1. Overall Size: 4-feet wide x 2-feet high
 2. Location: Mounted in Building Signboard (refer to Detail 6/AA100)
 3. Message: Graphics and Text to be provided by Architect.
- E. Panel Sign 05: General Building Description of LEED Certification and Net Zero Energy
1. Overall Size: 4-feet wide x 2-feet high
 2. Location: Interior Mounted in Lobby 202
 3. Message: Graphics and Text to be provided by Architect.
- F. Panel Sign 06: General Building Description Geothermal System
1. Overall Size: 2'-6" wide x 1'-6" high
 2. Location: Interior Mounted in Corridor 117
 3. Message: Graphics and Text to be provided by Architect
- G. Panel Sign 07: General Building Description Photovoltaic System
1. Overall Size: 2'-6" wide x 1'-6" high
 2. Location: Interior Mounted in Lobby 202
 3. Message: Graphics and Text to be provided by Architect
- H. Panel Sign 08: General Building Description of Native Wood, Milled by DEEP
1. Overall Size: 2'-6" wide x 1'-6" high
 2. Location: Interior Mounted in Conference Room 205
 3. Message: Graphics and Text to be provided by Architect
- I. Panel Sign 09: Building Identification Sign
1. Overall Size: 1'-6" wide x 2-feet high
 2. Location: Exterior Wall Mounted adjacent to Door A1
 3. Message: "CT DEEP Park Maintenance Shop" with DEEP Logo.

- J. Panel Sign 10: Building Identification Sign
1. Overall Size: 1'-6" wide x 2-feet high
 2. Location: Exterior Wall Mounted adjacent to Door A1
 3. Message: "CT DEEP Park Maintenance Storage" with DEEP Logo.

END OF SECTION 101423

SECTION 101425 - ROOM-IDENTIFICATION PANEL SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes room-identification signs that are directly attached to the building.
- B. Related Requirements:
 - 1. Section 017419 - Construction and Demolition Waste Management and Disposal
 - 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
 - 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
 - 4. Section 101423 "Panel Signs" for exterior Building Identification Signs and interior and exterior interpretive signage .

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 DEFINITIONS

- A. Accessible: In accordance with the accessibility standard.

1.5 COORDINATION

- A. Furnish templates for placement of sign-anchorage devices embedded in permanent construction by other installers.
- B. Furnish templates for placement of electrical service embedded in permanent construction by other installers.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Shop Drawings: For room-identification signs.
 - 1. Include fabrication and installation details and attachments to other work.
 - 2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
 - 3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at full size.
 - 4. Shop Drawings shall be reviewed and approved by the Office of the State Building Inspector, prior to fabrication.
- D. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.
 - 1. Include representative Samples of available typestyles and graphic symbols.
- E. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:
 - 1. Room-Identification Signs: Full-size Sample.
 - 2. Exposed Accessories: Full-size Sample of each accessory type.
 - 3. Full-size Samples, if approved, will be returned to Contractor for use in Project.
- F. Product Schedule: For room-identification signs. Use same designations indicated on Drawings or specified.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and manufacturer.

B. Sample Warranty: For special warranty.

1.8 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer of products or an entity that employs installers and supervisors who are trained and approved by manufacturer.

1.10 FIELD CONDITIONS

A. Field Measurements: Verify locations of anchorage devices embedded in permanent construction by other installers by field measurements before fabrication and indicate measurements on Shop Drawings.

1.11 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
 1. Deterioration of finishes beyond normal weathering.
 2. Deterioration of embedded graphic image.
 3. Separation or delamination of sheet materials and components.
2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and CC A117.1.

2.3 ROOM-IDENTIFICATION SIGNS - INTERIOR

- A. Room-Identification Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide ASI Signage Innovations, InTac Eco ADA-Ready Sign System; or comparable product by one of the following:
 - 1. ACE Sign Systems, Inc.
 - 2. Best Sign Systems, Inc.

- B. Sign Face: Agri-based plant bio-polymer product consisting of a plant material with starches removed, processed into pellets that are molded into the final sign substrate material.
 - 1. Thickness: 0.0625"
 - 2. Size: Square in size required for message, but not less than 8 3/4"

- C. Certifications:
 - 1) Material is certified by BPI and complies with ASTM D6400 as a compostable material, when placed in an aerated and managed landfill.
 - a. Color: White.
 - b. Finish: Matte, non-glare; ADA compliant. Available Sign Finishing Processes:
 - 1) Acrylic Polyurethane Paint; low-VOC (<50 g/L).
 - 2) UV digital imaging.
 - 3) UV digital textures.

- D. Sign Face: Class A (ASTM E84), wood-based product consisting of 70% virgin wood fiber produced from renewable sources, and is recyclable/reusable.
 - 1. Thickness: 0.25"
 - 2. Certifications:
 - a. GEI GREENGUARD Indoor Air Quality® Certified.
 - 3. Colors: To be selected by Architect from Manufacturer's full range of options.
 - 4. Finish: Matte, non-glare; ADA compliant; graffiti-resistant.
 - 5. Material Edges: Black.

- E. Applied Lettering and/or Numerals: Made from agri-based plant bio-polymer product consisting of a plant material with starches removed.

1. Thickness: 0.03125"
2. Copy Color: To be selected by Architect from Manufacturer's full range of options.

F. Braille Application: Raster™ balls pressed into material face, Black

G. Sign-Panel Perimeter: Finish edges smooth.

1. Edge Condition Square cut.
2. Corner Condition in Elevation: Square.
3. Mounting: Two-face tape
4. Text and Typeface: Accessible raised characters and Braille

2.4 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following:
1. Use concealed fasteners and anchors unless indicated to be exposed.
- B. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch thick, with adhesive on both sides.

2.5 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
 2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
 3. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.

2.6 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in 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 contrast.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
 - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
 - 3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
- B. Accessibility: Install signs in locations on walls as indicated on Drawings, according to the accessibility standard and as directed by Architect.
- C. Mounting Methods:
 - 1. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.

3.2 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

3.3 ROOM IDENTIFICATION SIGNAGE SCHEDULE

- A. Begins on Next Page.

B. Lower Level Room Identification Signs:

| SIGN TYPE | QUANTITY | MESSAGE (all signs to include 3-digit room number) |
|-----------|----------|---|
| A | 2 | “CT DEEP Environmental Conservation Police” |
| B | 1 | "Captain’s Office” |
| C | 1 | "Interview Room” |
| D | 1 | “Storage” |
| E | 1 | "Evidence Storage. Authorized Personnel Only” |
| F | 2 | "No Exit" |
| G | 2 | "Shower Room” (with UniSex and HCA Symbol) |
| H | 1 | “Fisheries Lab” |
| I | 1 | “Lab Support” |
| J | 3 | “Exit” with the Symbol of Accessibility” |
| K | 1 | “Stair” |
| L | 1 | “Corridor – To Elevator” – with symbol of accessibility |
| M | 1 | “Toilet Room” (with UniSex and HCA Symbol) |
| N | 1 | “Forestry Map Room” |
| O | 1 | “Custodial Room” |
| P | 1 | “Mechanical Room” |
| Q | 1 | “Electrical Room” |
| R | 1 | “Elevator Equipment” |
| S | 1 | “MDF” |

C. Upper Level and Mezzanine Room Identification Signs:

| SIGN TYPE | QUANTITY | MESSAGE (all signs to include 3-digit room number) |
|-----------|----------|---|
| AA | 2 | "Training Room" |
| BB | 5 | "Exit" with the Symbol of Accessibility" |
| CC | 2 | "Conference Room" |
| DD | 1 | "Men's Room" (with Male and HCA Symbol) |
| EE | 1 | "Women's Room" (with Male and HCA Symbol) |
| FF | 1 | "CT DEEP West District Headquarters" |
| GG | 1 | "Custodial Room" |
| HH | 7 | "Office" |
| II | 2 | "No Exit" with the Symbol of Accessibility |
| JJ | 2 | "Stair" |
| KK | 1 | "Mechanical Room" |

D. Garage Room Identification Signs:

| SIGN TYPE | QUANTITY | MESSAGE (all signs to include 3-digit room number) |
|-----------|----------|---|
| AAA | 1 | "Office" |
| BBB | 1 | "Maintenance Shop" |
| CCC | 1 | "Maintenance Garage" |
| DDD | 1 | "Custodial Room" |
| EEE | 1 | "Water Service Room" |
| FFF | 1 | "Mechanical Mezzanine Authorized Personnel Only" |
| GGG | 1 | "Break Room" |
| HHH | 1 | "Toilet Room" (with UniSex and HCA Symbol) |

END OF SECTION 101423

SECTION 102113 - PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-plastic toilet compartments configured as toilet enclosures.

B. Related Requirements:

1. Section 017419 - Construction and Demolition Waste Management and Disposal
2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
4. Section 102800 "Toilet, Bath and laundry Accessories" for accessories mounted on plastic toilet partitions.

1.2 COORDINATION

- A. Coordinate requirements for, blocking, reinforcing, and other supports concealed within wall.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 ACTION SUBMITTALS

A. Product Data:

1. Solid-plastic toilet compartments:

- a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.
- B. Sustainable Design Submittals:
1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Shop Drawings: For solid-plastic toilet compartments.
1. Include plans, elevations, sections, details, and attachment details.
 2. Show locations of cutouts for compartment-mounted toilet accessories.
 3. Show locations of centerlines of toilet fixtures.
 4. Show locations of floor drains.
 5. Shop Drawings shall be reviewed and approved by the Office of the State Building Inspector, prior to fabrication.
- D. Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available colors for each type of toilet compartment material indicated.
1. Include Samples of hardware and accessories involving material and color selection.
- E. Samples for Verification: Actual sample of finished products for each type of toilet compartment indicated.
1. Size: 6-inch-square, of same thickness indicated for Work.
 2. Include each type of hardware and accessory.
- F. Product Schedule: For toilet compartments, prepared by or under the supervision of supplier, detailing location and selected colors for toilet compartment material.
- G. Sustainable Design Submittals:
1. Environmental Product Declaration: For each product.
 2. Health Product Declaration: For each product.
 3. Sourcing of Raw Materials: Corporate sustainability report for each manufacturer.
- 1.5 INFORMATIONAL SUBMITTALS
- A. Certificates:
1. Product Certificates: For each type of toilet compartment by manufacturer.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For toilet compartments.

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements, and coordinate before fabrication.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire Performance: Tested in accordance with, and pass the acceptance criteria of, NFPA 286.
- B. Recycled Content of Aluminum Components: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- C. Regional Materials: Products shall be manufactured within 100 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project site.
- D. Regulatory Requirements: Comply with applicable provisions in the U.S. Department of Justice "2010 ADA Standards for Accessible Design" and ICC A117.1 for toilet compartments designated as accessible.

2.3 SOLID-PLASTIC TOILET COMPARTMENTS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Accurate Partitions Corp., an ASI Group Company.
 - 2. AJW Architectural Products.
 - 3. Scranton Products.
- B. Toilet-Enclosure Style: Overhead braced, Floor anchored.

- C. Door, Panel and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch thick, seamless, with eased edges, no-sightline system, and with homogenous color and pattern throughout thickness of material.
 - 1. Integral Hinges: Configure doors and pilasters to receive integral hinges.
 - 2. Color and Pattern: One color and pattern in each room as selected by Architect from manufacturer's full range.
- D. Pilaster Shoes and Sleeves (Caps): Manufacturer's standard design; polymer or stainless steel.
 - 1. Polymer Color and Pattern: Matching pilaster.
- E. Brackets (Fittings):
 - 1. Full-Height (Continuous) Type: Manufacturer's standard design; extruded aluminum or stainless steel.

2.4 HARDWARE AND ACCESSORIES

- A. Hardware and Accessories, Standard Duty: Manufacturer's standard operating hardware and accessories.
 - 1. Material: Clear-anodized aluminum or Stainless steel.
 - 2. Hinges: Manufacturer's standard paired, self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees, allowing emergency access by lifting door.
 - 3. Latch and Keeper: Manufacturer's standard surface-mounted latch unit, designed for emergency access, and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
 - 4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent inswinging door from hitting compartment-mounted accessories.
 - 5. Door Bumper: Manufacturer's standard rubber-tipped bumper at outswinging doors.
 - 6. Door Pull: Manufacturer's standard unit at outswinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.
- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.
- C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel compatible with related materials.

2.5 MATERIALS

- A. Aluminum Castings: ASTM B26/B26M.
- B. Aluminum Extrusions: ASTM B221.
- C. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304, stretcher-leveled standard of flatness.
- D. Stainless Steel Castings: ASTM A743/A743M.

2.6 FABRICATION

- A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.
- B. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
- C. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.
- D. Door Size and Swings: Unless otherwise indicated, provide 24-inch-wide, inswinging doors for standard toilet compartments and 36-inch-wide, outswinging doors with a minimum 32-inch-wide, clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.
 - 1. Confirm location and adequacy of blocking and supports required for installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF PLASTIC TOILET COMPARTMENTS

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
 - 1. Maximum Clearances:
 - a. Pilasters and Panels: 1/2 inch.
 - b. Panels and Walls: 1 inch.
 - 2. Full-Height (Continuous) Brackets: Secure panels to walls and to pilasters with full-height brackets.
 - a. Locate bracket fasteners, so holes for wall anchors occur in masonry or tile joints.
 - b. Align brackets at pilasters with brackets at walls.
- B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of panels and adjust, so tops of doors are parallel with overhead brace when doors are in closed position.
- C. Floor-Anchored Units: Set pilasters with anchors penetrating not less than 2 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Level, plumb, and tighten pilasters. Hang doors and adjust, so tops of doors are level with tops of pilasters when doors are in closed position.

3.3 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on inswinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on outswinging doors to return doors to fully closed position.

END OF SECTION 102113

SECTION 102239 - FOLDING PANEL PARTITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Manually operated, acoustical panel partitions.
- 2. Folding Panel Partition is Supplemental Bid 01

- B. Related Requirements:

- 1. Section 012313 "Supplemental Bids" for bidding requirements.
- 2. Section 017419 - Construction and Demolition Waste Management and Disposal
- 3. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
- 4. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
- 5. Section 055000 "Metal Fabrications" for supports that attach supporting tracks to overhead structural system.
- 6. Section 061800 "Glued-Laminated Construction" for structure supporting folding partitions.

1.3 DEFINITIONS

- A. NIC: Noise Isolation Class.
- B. NRC: Noise Reduction Coefficient.
- C. STC: Sound Transmission Class.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building

Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Shop Drawings: For operable panel partitions.
 - 1. Include plans, elevations, sections, attachment details.
 - 2. Indicate stacking and operating clearances. Indicate location and installation requirements for hardware and track, blocking, and direction of travel.
- D. Samples for Initial Selection: For each type of exposed material, finish, covering, or facing.
 - 1. Include Samples of accessories involving color selection.
- E. Samples for Verification: For each type of exposed material, finish, covering, or facing, prepared on Samples of size indicated below:
 - 1. Textile Facing Material: Full width by not less than 36-inch-long section of fabric from dye lot to be used for the Work, with specified treatments applied. Show complete pattern repeat.
 - 2. Panel Facing Material: Manufacturer's standard-size unit, not less than 3 inches square.
 - 3. Panel Edge Material: Not less than 3 inches long.
 - 4. Hardware: One of each exposed door-operating device.
- F. Engineered Submittal: For operable panel partitions.
 - 1. Include design calculations for seismic restraints that brace tracks to structure above, including analysis verifying compliance with requirements. Submittal shall include details of folding door assembly and fabrication, as well as mounting to substrates.

1.6 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Partition track, track supports and bracing, switches, turning space, and storage layout.
 - 2. Ceiling components.
 - 3. Structural members to which suspension systems will be attached.
- B. Setting Drawings: For embedded items and cutouts required in other work, including support-beam, mounting-hole template.
- C. Qualification Data: For Installer and testing agency.
- D. Seismic Qualification Certificates: For operable panel partitions, tracks, accessories, and components, from manufacturer. Include seismic capacity of partition assemblies to remain in vertical position during a seismic event and the following:
 - 1. Basis for Certification: Indicate whether certification is based on analysis, testing, or experience data, according to ASCE/SEI 7.
 - 2. Detailed description of partition anchorage devices on which the certification is based and their installation requirements.
- E. Product Certificates: For each type of operable panel partition.
 - 1. Include approval letter signed by manufacturer acknowledging Owner-furnished panel facing material complies with requirements.
- F. Product Test Reports: For each operable panel partition, for tests performed by a qualified testing agency.
- G. Field quality-control reports.
- H. Sample Warranty: For manufacturer's special warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For operable panel partitions to include in maintenance manuals.
 - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - a. Panel finish facings and finishes for exposed trim and accessories. Include precautions for cleaning materials and methods that could be detrimental to finishes and performance.
 - b. Seals, hardware, track, track switches, carriers, and other operating components.

1.8 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same production run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Panel Finish-Facing Material: Furnish full width in quantity to cover both sides of two panels when installed.

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Protectively package and sequence panels in order for installation. Clearly mark packages and panels with numbering system used on Shop Drawings. Do not use permanent markings on panels.

1.11 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of operable panel partitions that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Faulty operation of operable panel partitions.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal use.
 - 2. Warranty Period:
 - a. Panel and Finish: Two years from date of Substantial Completion.
 - b. Hardware: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design seismic bracing of tracks to structure above.
- B. Seismic Performance: Operable panel partitions shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the partition panels will remain in place without separation of any parts when subjected to the seismic forces specified."
- C. Acoustical Performance: Provide operable panel partitions tested by a qualified testing agency for the following acoustical properties according to test methods indicated:
 - 1. Sound-Transmission Requirements: Operable panel partition assembly tested for laboratory sound-transmission loss performance according to ASTM E90, determined by ASTM E413, and rated for not less than the STC indicated.
 - 2. Noise-Reduction Requirements: Operable panel partition assembly, identical to partition tested for STC, tested for sound-absorption performance according to ASTM C423, and rated for not less than the NRC indicated.
 - 3. Noise-Isolation Requirements: Installed operable panel partition assembly, identical to partition tested for STC, tested for NIC according to ASTM E336, determined by ASTM E413, and rated for 10 dB less than STC value indicated.
- D. Fire-Test-Response Characteristics: Provide panels with finishes complying with the following as determined by testing identical products by a testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.

2.3 OPERABLE ACOUSTICAL PANELS – Supplemental Bid 01

- A. Operable Acoustical Panels: Partition system, including panels, seals, finish facing, suspension system, operators, and accessories.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Modernfold, Inc; Acoustiseal 932, or a comparable product by one of the following:
 - a. Hufcor, Inc.
 - b. Panelfold Inc.
- B. Panel Operation: Manually operated, paired panels.

- C. Panel Construction: As required to support panel from suspension components and with reinforcement for hardware attachment. Fabricate panels with tight hairline joints and concealed fasteners. Fabricate panels so finished in-place partition is rigid; level; plumb; aligned, with tight joints and uniform appearance; and free of bow, warp, twist, deformation, and surface and finish irregularities.
- D. Dimensions: Fabricate operable acoustical panel partitions to form an assembled system of dimensions indicated and verified by field measurements.
 - 1. Panel Width: Equal widths for length indicated.
- E. STC: Not less than 41.
- F. Panel Weight: 6.5 lb/sq. ft. maximum.
- G. Panel Thickness: Nominal dimension of 3 inches.
- H. Panel Materials:
 - 1. Steel Frame: Roll-formed and welded 16 gage sheet.
 - 2. Skin / Face: ½" tackable, 100% recycled moisture and mold resistant gypsum board. Class A rated, bonded to frame.
- I. Panel Closure: Manufacturer's standard unless otherwise indicated.
 - 1. Vertical Interlocking Sound Seals between panels: Roll-formed steel astragals, with reversible tongue and groove configuration in each panel edge for universal panel operation. Rigid plastic or aluminum astragals or astragals in only one panel edge are not acceptable.
 - 2. Horizontal Top Seals: Continuous contact extruded vinyl bulb shape with pairs of non-contacting vinyl fingers to prevent distortion without the need for mechanically operated parts.
 - 3. Horizontal Bottom Seals: Automatic operable seals providing nominal 2-inch operating clearance with an operating range of +1/2-inch to -1-1/2-inch which automatically drop as panels are positioned, without the need for tools or cranks.
- J. Hardware: Manufacturer's standard as required to operate operable panel partition and accessories; with decorative, protective finish.
 - 1. Hinges: Manufacturer's standard.
- K. Suspension System:
 - 1. Suspension Tracks: Minimum 11-gage, 0.12-inch roll-formed steel track, suitable for direct mounting to Glulam Beam. Aluminum track is not acceptable.
 - a. Exposed track soffit: Steel, integral to track, and pre-painted off-white.
 - b. Carriers: One all-steel trolley with steel-tired ball bearing wheels per panel. Non-steel tires are not acceptable.

- L. Finish Facing: Fabric wall covering.

2.4 PANEL FINISH FACINGS

- A. Description: Finish facings for panels that comply with indicated fire-test-response characteristics and that are factory applied to operable panel partitions with appropriate backing, using mildew-resistant nonstaining adhesive as recommended by facing manufacturer's written instructions.
 - 1. Apply one-piece, seamless facings free of air bubbles, wrinkles, blisters, and other defects, with no gaps or overlaps. Horizontal butted edges and seams are not permitted. Tightly secure and conceal raw and selvage edges of facing for finished appearance.
 - 2. Where facings with directional or repeating patterns or directional weave are indicated, mark facing top and attach facing in same direction.
 - 3. Match facing pattern 72 inches above finished floor.
- B. Fabric Wall Covering: Manufacturer's standard fabric, from same dye lot, treated to resist stains.
 - 1. Color/Pattern: As selected by Architect from manufacturer's full range.
- C. Cap-Trimmed Edges: Protective perimeter-edge trim with tight hairline joints concealing edges of panel and finish facing, finished as follows:
 - 1. Aluminum: Finished with manufacturer's standard clear anodic finish.

2.5 SUSPENSION SYSTEMS

- A. Tracks: Steel mounted directly to overhead structural support, designed for operation, size, and weight of operable panel partition indicated. Size track to support partition operation and storage without damage to suspension system, operable panel partitions, or adjacent construction. Limit track deflection to no more than 0.10 inch between bracket supports. Provide a continuous system of track sections and accessories to accommodate configuration and layout indicated for partition operation and storage.
 - 1. Panel Guide: Aluminum guide on both sides of the track to facilitate straightening of the panels; finished with factory-applied, decorative, protective finish.
 - 2. Head Closure Trim: As required for acoustical performance; with factory-applied, decorative, protective finish.
- B. Carriers: Trolley system as required for configuration type, size, and weight of partition and for easy operation; with ball-bearing wheels.
- C. Steel Finish: Manufacturer's standard, factory-applied, corrosion-resistant, protective coating unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine flooring, floor levelness, structural support, and opening, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of operable panel partitions.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install operable panel partitions and accessories after other finishing operations, including painting, have been completed in area of partition installation.
- B. Install panels in numbered sequence indicated on Shop Drawings.
- C. Broken, cracked, chipped, deformed, or unmatched panels are not acceptable.
- D. Broken, cracked, deformed, or unmatched gasketing or gasketing with gaps at butted ends is not acceptable.
- E. Light-Leakage Test: Illuminate one side of partition installation and observe vertical joints and top and bottom seals for voids. Adjust partitions for alignment and full closure of vertical joints and full closure along top and bottom seals.

3.3 ADJUSTING

- A. Adjust operable panel partitions, hardware, and other moving parts to function smoothly, and lubricate as recommended by manufacturer.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain operable panel partitions.

END OF SECTION 102239

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.
2. Public-use shower room accessories.
3. Custodial accessories.

B. Related Requirements:

1. Section 017419 - Construction and Demolition Waste Management and Disposal
2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
4. Section 102112 "Plastic Toilet Compartments" for substrates toilet compartments.
5. Drawing 6/AA902 for Toilet Accessories Schedule
6. Drawing P601 "Plumbing Fixture Schedule" for accessories scheduled with plumbing fixtures.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - 2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
 - 3. Include electrical characteristics.
- A. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- B. Samples: For each exposed product and for each finish specified, full size.
 - 1. Approved full-size Samples will be returned and may be used in the Work.
- C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
 - 1. Identify locations using room designations indicated.
 - 2. Identify accessories using designations indicated.

1.6 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For manufacturer's special warranties.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For accessories to include in maintenance manuals.

1.8 WARRANTY

- A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, visible silver spoilage defects.
 - 2. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty for Accessories: Manufacturer agrees to repair or replace s that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2–PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Design accessories and fasteners to comply with the following requirements:
 - 1. Grab Bars: Installed units are able to resist 250 lbf concentrated load applied in any direction and at any point.
 - 2. Shower Seats: Installed units are able to resist 360 lbf applied in any direction and at any point.

2.3 PUBLIC-USE WASHROOM ACCESSORIES

- A. Source Limitations: Obtain each type of public-use washroom accessory from single source from single manufacturer.
- B. Toilet and Shower Room Accessories: Refer to Schedule on Drawing 6/AA902:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide products identified in the Toilet Room Accessories Schedule or a comparable product by one of the following:
 - a. AJW Architectural Products.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.

2.4 PUBLIC-USE SHOWER ROOM ACCESSORIES

- A. Source Limitations: Obtain each type of public-use shower room accessory from single source from single manufacturer.
- B. Toilet and Shower Room Accessories: Refer to Schedule on Drawing 6/AA902:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide products identified in the Toilet Room Accessories Schedule or a comparable product by one of the following:
 - a. AJW Architectural Products.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.

2.5 UNDERLAVATORY GUARDS

- A. Underlavatory Guard: Refer to Plumbing Schedule on Drawing P601:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide products identified in Plumbing Fixture schedule, or a comparable product by one of the following:
 - a. Buckaroos, Inc.
 - b. Plumberex Specialty Products, Inc.
 - c. Truebro by IPS Corporation.
 - 2. Description: Insulating pipe covering for supply and drain piping assemblies that prevents direct contact with and burns from piping; allow service access without removing coverings.
 - 3. Material and Finish: Antimicrobial, molded plastic, white.

2.6 CUSTODIAL ACCESSORIES

- A. Source Limitations: Obtain each type of custodial accessory from single source from single manufacturer.
- B. Custodial Utility Shelf with mop and broom holders: Provide in the following locations and quantities:
 - 1. (1) 3-foot shelf in "Janitor 121"
 - 2. (1) 3-foot shelf in "Janitor 207"
 - 3. (1) 3-foot shelf in Custodial 006 (in Garage)
- C. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick Washroom Equipment, Inc; B-239x34 or a comparable product by one of the following:

- a. AJW Architectural Products.
- b. Bradley Corporation.

2.7 MATERIALS

- A. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.031-inch-minimum nominal thickness unless otherwise indicated.
- B. Fasteners: Screws, bolts, and other devices of same material as accessory unit, unless otherwise recommended by manufacturer or specified in this Section, and tamper and theft resistant where exposed, and of stainless or galvanized steel where concealed.
- C. Mirrors: ASTM C1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.8 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
 - 1. Remove temporary labels and protective coatings.
- B. Grab Bars: Install to comply with specified structural-performance requirements.
- C. Shower Seats: Install to comply with specified structural-performance requirements.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION 102800

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SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.
- B. Related Requirements:
 - 1. Section Section 017419 - Construction and Demolition Waste Management and Disposal
 - 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
 - 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.
- B. Sustainable Design Submittals:

1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.

1.5 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.7 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Failure of hydrostatic test according to NFPA 10 when testing interval required by NFPA 10 is within the warranty period.
 - b. Faulty operation of valves or release levers.
 2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2–PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
 - 1. Provide fire extinguishers approved, listed, and labeled by FM Global.

2.3 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each mounting bracket indicated.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Guardian Fire Equipment, Inc.
 - b. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - c. Kidde Residential and Commercial Division.
 - d. Larsens Manufacturing Company.
 - e. Nystrom.
 - 2. Source Limitations: Obtain fire extinguishers, fire-protection cabinets, and accessories, from single source from single manufacturer.
 - 3. Valves: Manufacturer's standard.
 - 4. Handles and Levers: Manufacturer's standard.
 - 5. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.
- B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 3-A:40-B:C, 6-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.4 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.
 - 1. Source Limitations: Obtain mounting brackets and fire extinguishers from single source from single manufacturer.
- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
 - 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

- a. Orientation: Vertical or Horizontal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.
 - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
 - 1. Mounting Brackets: Top of fire extinguisher to be at 42 inches above finished floor.
- B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416

SECTION 105113 - METAL LOCKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Welded athletic lockers.
- 2. Locker benches.

- B. Related Sections:

- 1. Section 017419 - Construction and Demolition Waste Management and Disposal
- 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
- 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal locker and bench.

- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Shop Drawings: For metal lockers.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Show locker trim and accessories.
 - 3. Include locker identification system and numbering sequence.
- D. Samples: For each color specified, in manufacturer's standard size.
- E. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available.
- F. Samples for Verification: For the following products, in manufacturer's standard size:
 - 1. Lockers and equipment.
 - 2. Locker benches.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver metal lockers until spaces to receive them are clean, dry, and ready for their installation.

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify actual dimensions of recessed openings by field measurements before fabrication.

1.9 COORDINATION

- A. Coordinate sizes and locations of concrete masonry bases for metal lockers.
- B. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other Sections to ensure that metal lockers can be supported and installed as indicated.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures.
 - b. Faulty operation of latches and other door hardware.
 - 2. Damage from deliberate destruction and vandalism is excluded.
 - 3. Warranty Period for Welded Metal Lockers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 MANUFACTURERS

- A. Source Limitations: Obtain metal lockers, locker benches, and accessories from single source from single locker manufacturer.

2.3 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: For lockers indicated to be accessible, comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

2.4 WELDED ATHLETIC LOCKERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AJW Architectural Products.
 - 2. Lyon Workspace Products, LLC.
 - 3. Penco Products, Inc.
- B. Perforated Doors: One piece; fabricated from 0.075-inch nominal-thickness steel sheet with manufacturer's standard diamond perforations; formed into channel shape with double bend at vertical edges and with right-angle single bend at horizontal edges and latch point (bottom) and right-angle single bend at remaining edges for box lockers.
 - 1. Reinforcement: Manufacturer's standard reinforcing angles, channels, or stiffeners for doors more than 15 inches wide; welded to inner face of doors.
- C. Body: Assembled by welding body components together. Fabricate from unperforated steel sheet with thicknesses as follows:
 - 1. Tops and Bottoms: 0.060-inch nominal thickness, with single bend at edges.
 - 2. Backs: 0.048-inch nominal thickness.
 - 3. Shelves: 0.060-inch nominal thickness, with double bend at front and single bend at sides and back.
- D. Unperforated Sides: Fabricated from 0.048-inch nominal-thickness steel sheet.
- E. Frames: Channel formed; fabricated from 0.060-inch nominal-thickness steel sheet or 0.097-inch nominal-thickness steel angles; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral, full-height door strikes on vertical main frames.
- F. Reinforced Bottoms: Structural channels, formed from 0.060-inch nominal-thickness steel sheet; welded to front and rear of side-panel frames.
- G. Hinges: Welded to door and attached to door frame with no fewer than two factory-installed rivets per hinge that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees; self-closing.
 - 1. Hinges: Manufacturer's standard, steel, continuous or knuckle type.
- H. Recessed Door Handle and Latch: Stainless -steel cup with integral door pull, recessed so locking device does not protrude beyond door face; pry and vandal resistant.
 - 1. Multipoint Latching: Finger-lift latch control designed for use with built-in combination locks, built-in cylinder locks, or padlocks; positive automatic latching and prelocking.
 - a. Latch Hooks: Equip doors 48 inches and higher with three latch hooks and doors less than 48 inches high with two latch hooks; fabricated from 0.120-inch nominal-

thickness steel sheet; welded to full-height door strikes; with resilient silencer on each latch hook.

- b. Latching Mechanism: Manufacturer's standard, rattle-free latching mechanism and moving components isolated to prevent metal-to-metal contact, and incorporating a prelocking device that allows locker door to be locked while door is open and then closed without unlocking or damaging lock or latching mechanism.
 - I. Door Handle and Latch for Box Lockers: Stainless steel strike plate with integral pull; with steel padlock loop that projects through metal locker door.
 - J. Identification Plates: Manufacturer's standard, etched, embossed, or stamped aluminum plates, with numbers and letters at least 3/8 inch high.
 - K. Hooks: Manufacturer's standard ball-pointed, aluminum or steel; zinc plated.
 - L. Coat Rods: Manufacturer's standard.
 - M. Continuous Zee Base: 4 inches high; fabricated from 0.075-inch nominal-thickness steel sheet.
 - N. Continuous Sloping Tops: Fabricated from 0.048-inch nominal-thickness steel sheet, with a pitch of approximately 20 degrees.
 1. Closures: Vertical-end type.
 - O. Recess Trim: Fabricated from 0.048-inch nominal-thickness steel sheet.
 - P. Filler Panels: Fabricated from 0.048-inch nominal-thickness steel sheet.
 - Q. Boxed End Panels: Fabricated from 0.060-inch nominal-thickness steel sheet.
 - R. Materials:
 1. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B; with A60 zinc-iron, alloy (galvannealed) coating designation.
 2. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
 - S. Finish: Baked enamel or powder coat.
 1. Color: As selected by Architect from manufacturer's full range.
- 2.5 LOCKER BENCHES
- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. AJW Architectural Products.
 2. Lyon Workspace Products, LLC.

3. Penco Products, Inc.
- B. Provide Sizes:
1. Bench units with overall assembly height of 17-1/2 inches.
 2. Bench at Locker Room 111: 20-inches deep x 60-inches long
 3. Bench at Locker Room 112: 12-inches deep x 30-inches long
- C. Bench Tops: Manufacturer's standard one-piece units, with rounded corners and edges.
1. Size: Minimum Provide 20- to 24-inch-wide tops.
 2. Laminated clear hardwood with one coat of clear sealer on all surfaces and one coat of clear lacquer on top and sides.
- D. Fixed-Bench Pedestals: Manufacturer's standard supports, with predrilled fastener holes for attaching bench top and anchoring to floor, complete with fasteners and anchors, and as follows:
1. Tubular Steel: 1-1/2-inch-diameter steel tubing threaded on both ends, with standard pipe flange at top and bell-shaped cast-iron base; with baked-enamel or powder-coat finish; anchored with exposed fasteners.
 - a. Color: Match metal lockers.
- E. Materials:
1. Steel Tube: ASTM A500/A500M, cold rolled.

2.6 FABRICATION

- A. Fabricate metal lockers square, rigid, without warp, and with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch and free of sharp edges and burrs.
1. Form body panels, doors, shelves, and accessories from one-piece steel sheet unless otherwise indicated.
 2. Provide fasteners, filler plates, supports, clips, and closures as required for complete installation.
- B. Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments.
- C. Equipment: Provide each locker with an identification plate and the following equipment:
1. Single-Tier Units: Shelf, one double-prong ceiling hook, and two single-prong wall hooks.
 2. Coat Rods: For each compartment of each locker.
- D. Welded Construction: Factory preassemble metal lockers by welding all joints, seams, and connections; with no bolts, nuts, screws, or rivets used in assembly of main locker groups.

Factory weld main locker groups into one-piece structures. Grind exposed welds smooth and flush.

- E. Accessible Lockers: Fabricate as follows:
 - 1. Locate bottom shelf no lower than 15 inches above the floor.
 - 2. Where hooks, coat rods, or additional shelves are provided, locate no higher than 48 inches above the floor.
- F. Continuous Zee Base: Fabricated in lengths as long as practical to enclose base and base ends; finished to match lockers.
- G. Continuous Sloping Tops: Fabricated in lengths as long as practical, without visible fasteners at splice locations; finished to match lockers.
 - 1. Sloping-top corner fillers, mitered.
- H. Recess Trim: Fabricated with minimum 2-1/2-inch face width and in lengths as long as practical; finished to match lockers.
- I. Filler Panels: Fabricated in an unequal leg angle shape; finished to match lockers. Provide slip-joint filler angle formed to receive filler panel.
- J. Finished End Panels: Fabricated to conceal unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of nonrecessed metal lockers; finished to match lockers.
 - 1. Provide one-piece panels for double-row (back-to-back) locker ends.

2.7 ACCESSORIES

- A. Fasteners: Zinc- or nickel-plated steel, slotless-type, exposed bolt heads; with self-locking nuts or lock washers for nuts on moving parts.
- B. Anchors: Material, type, and size required for secure anchorage to each substrate.
 - 1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls for corrosion resistance.
 - 2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls and floors or support bases, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install lockers level, plumb, and true; shim as required, using concealed shims.
 - 1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36 inches o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion.
 - 2. Anchor single rows of metal lockers to walls near top of lockers and to floor.
 - 3. Anchor back-to-back metal lockers to floor.
- B. Welded Lockers: Connect groups together with manufacturer's standard fasteners, with no exposed fasteners on face frames.
- C. Equipment:
 - 1. Attach hooks with at least two fasteners.
 - 2. Attach door locks on doors using security-type fasteners.
 - 3. Identification Plates: Identify metal lockers with identification indicated on Drawings.
 - a. Attach plates to each locker door, near top, centered, with at least two aluminum rivets.
 - b. Attach plates to upper shelf of each open-front metal locker, centered, with a least two aluminum rivets.
- D. Trim: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.
 - 1. Attach recess trim to recessed metal lockers with concealed clips.
 - 2. Attach filler panels with concealed fasteners. Locate filler panels where indicated on Drawings.
 - 3. Attach sloping-top units to metal lockers, with closures at exposed ends.
 - 4. Attach finished end panels using fasteners only at perimeter to conceal exposed ends of nonrecessed metal lockers.
- E. Fixed Benches: Provide no fewer than two pedestals for each bench, uniformly spaced not more than 72 inches apart. Securely fasten tops of pedestals to undersides of bench tops, and anchor bases to floor.

3.3 ADJUSTING

- A. Clean, lubricate, and adjust hardware. Adjust doors and latches to operate easily without binding.

3.4 PROTECTION

- A. Protect metal lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit use during construction.
- B. Touch up marred finishes, or replace metal lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION 105113

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SECTION 107119 – SOLAR SHADING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fixed horizontal exterior sunshades.

B. Related Sections:

1. Section 017419 - Construction and Demolition Waste Management and Disposal
2. Section 018113 “Sustainable Design Requirements” for general, administrative, procedural and product requirements for compliance with requirements of the USGBC’s, LEED for BD & C, Version 4.1.
3. Section 018119 “Construction Indoor Air Quality Requirements” for requirements related to construction indoor air quality.

1.2 REFERENCES

A. Aluminum Association (AA) DAF 45 - Designation System for Aluminum Finishes.

B. American Architectural Manufacturers Association (AAMA):

1. 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Architectural Extrusions and Panels.
2. 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Architectural Extrusions and Panels.

C. American Society of Civil Engineers (ASCE) 7 - Minimum Design Loads for Buildings and Other Structures.

D. ASTM International (ASTM):

1. B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
2. E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

1. The Owner requires the Contractor to implement practices and procedures to meet the Project’s environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut’s

High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification

1.4 SYSTEM DESCRIPTION

- A. Design Requirements: Design sunshade system to withstand:
1. Design wind pressure in accordance with Building Code and wind load criteria indicated on drawings and with maximum allowable deflection of L/175, tested in accordance with ASTM E330.
 2. Movement caused by an ambient temperature range of 120 degrees F and a surface temperature range of 160 degrees F.

1.5 SUBMITTALS

- A. Submittals for Review:
1. Shop Drawings: Indicate system components, dimensions, attachments, and accessories.
 2. Samples:
 - a. 3 x 3 inch coating samples showing available colors.
 - b. 12 inch long louver samples showing profile and finish.
 - c. 12 x 12 inch sunshade samples showing louvers and supports.
- B. Sustainable Design Submittals:
1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Minimum 5 years documented experience in work of this Section.
- B. Mockup:
1. Provide mockup of sunshade system including framing, supports, louvers, and attachments.
 2. Size: Minimum 8 feet long x full depth.
 3. Locate where directed.
 4. Approved mockup may remain as part of the Work.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 MANUFACTURERS

- a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Construction Specialties, Inc., Model 100-3, 6” Airfoil Blade
 - 2. Unicel Architectural, Fixed Solar Shading System
 - 3. Architectural louvers, H6A Airfoil Blade
- b. Source Limitations: Obtain metal building system components, including primary and secondary framing and metal panel assemblies, from single source from single manufacturer.

2.3 MATERIALS

- A. Aluminum Extrusions:
 - 1. ASTM B221, 6063-T5 alloy and temper.

2.4 COMPONENTS

- A. Louvers:
 - 1. Type: Hollow extruded aluminum, airfoil shaped.
 - 2. Size: 2 inches thick x 6 inches deep.
 - 3. Spacing: 8 inches on center.
 - 4. Angle: 45-degrees
- B. Louver Supports: Extruded aluminum, shaped to louver profile, continuously welded to louvers.
- C. Framing: Extruded aluminum, Manufacturer’s standard outriggers, but not less than 6-inch-deep.
- D. Attachment Plates: Extruded aluminum, match outrigger depth x 3/8 inch thick x length as required..
- E. Tension Rods: Stainless steel with threaded ends and lock nuts.

- F. Other Components: Aluminum end panels, outriggers, and other components as indicated or as required for system attachment and performance.

2.5 ACCESSORIES

- A. Anchors and Fasteners: Stainless steel.

2.6 FABRICATION

- A. Fabricate sunshade system in accordance with approved Shop Drawings.
- B. Accurately fit and secure joints and intersections.
- C. Fabricate in largest practical units.

2.7 FINISHES

- A. Aluminum:
 - 1. Type: AAMA 2605, fluoropolymer coating containing minimum 70 percent PVDF resins.
 - 2. Source: Duranar by PPG Industries, Inc. or equivalent.
 - 3. Color: To be selected from manufacturer's full color range.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions and approved Shop Drawings.
- B. Install components plumb and level, in proper plane, free from warp and twist.
- C. Anchor system to building components; provide adequate clearance for movement caused by thermal expansion and contraction and wind loads.

3.2 ADJUSTING

- A. Touch up minor scratches and abrasions on finished surfaces to match original finish.

END OF SECTION

SECTION 122413 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Manually operated roller shades with single rollers.
2. Motor-operated roller shades with single rollers.

B. Related Requirements:

1. Section 017419 - Construction and Demolition Waste Management and Disposal
2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
4. Section 085200 "Wood Windows" for window assemblies.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.
 - B. Sustainable Design Submittals:
 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
 - C. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.
 1. Motor-Operated Shades: Include details of installation and diagrams for power, signal, and control wiring.
 - D. Samples: For each exposed product and for each color and texture specified, 10 inches long.
 - E. Samples for Initial Selection: For each type and color of shadeband material.
 1. Include Samples of accessories involving color selection.
 - F. Samples for Verification: For each type of roller shade.
 1. Shadeband Material: Not less than 10 inches square. Mark interior face of material if applicable.
 2. Installation Accessories: Full-size unit, not less than 10 inches long.
 - G. Product Schedule: For roller shades. Use same designations indicated on Drawings.
- 1.5 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For Installer.
 - B. Product Certificates: For each type of shadeband material.
 - C. Product Test Reports: For each type of shadeband material, for tests performed by manufacturer and witnessed by a qualified testing agency or by a qualified testing agency.
- 1.6 CLOSEOUT SUBMITTALS
- A. Operation and Maintenance Data: For roller shades to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 - 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 MANUFACTURERS

- A. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.3 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Draper Inc.
 2. Hunter Douglas Contract.
 3. MechoShade Systems, Inc.
- B. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
1. Bead Chains: Manufacturer's standard.
 - a. Loop Length: Full length of roller shade.
 - b. Limit Stops: Provide upper and lower ball stops.
 - c. Chain-Retainer Type: Clip, jamb mount.
 2. Spring Lift-Assist Mechanisms: Manufacturer's standard for balancing roller shade weight and for lifting heavy roller shades.
 - a. Provide for shadebands that weigh more than 10 lb or for shades as recommended by manufacturer, whichever criterion is more stringent.
- C. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
1. Roller Drive-End Location: Right side of interior face of shade, unless otherwise indicated.
 2. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
 3. Shadeband-to-Roller Attachment: Manufacturer's standard method.
- D. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- E. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.
- F. Shadebands:
1. Shadeband Material: Light-filtering fabric.
 2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
 - a. Type: Enclosed in sealed pocket of shadeband material.
 - b. Color and Finish: As selected by Architect from manufacturer's full range.

G. Installation Accessories:

1. Exposed Headbox: Rectangular, extruded-aluminum enclosure including front fascia, top and back covers, endcaps, and removable bottom closure.
 - a. Height: Manufacturer's standard height required to enclose roller and shadeband assembly when shade is fully open, but not less than 3 inches.
2. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.4 MOTOR-OPERATED, SINGLE-ROLLER SHADES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Draper Inc.
2. Hunter Douglas Contract.
3. MechoShade Systems, Inc.

B. Motorized Operating System: Provide factory-assembled, shade-operator system of size and capacity and with features, characteristics, and accessories suitable for conditions indicated, complete with electric motor and factory-prewired motor controls, power disconnect switch, enclosures protecting controls and operating parts, and accessories required for reliable operation without malfunction. Include wiring from motor controls to motors. Coordinate operator wiring requirements and electrical characteristics with building electrical system.

1. Electrical Components: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Electric Motor: Manufacturer's standard tubular, enclosed in roller.
 - a. Electrical Characteristics: Solar-powered dc.
 - b. Maximum Total Shade Width: As required to operate roller shades indicated.
 - c. Maximum Shade Drop: As required to operate roller shades indicated.
 - d. Maximum Weight Capacity: As required to operate roller shades indicated.
3. Remote Control: Electric controls with NEMA ICS 6, Type 1 enclosure for surface mounting. Provide the following for remote-control activation of shades:
 - a. Individual Switch Control Station (sun-sensor override): Momentary-contact, wall-switch-operated control station with open, close, and center off functions.
 - 1) Switch Positions: Three.
 - 2) Switch Style: Rocker.
 - b. Sun Sensor Control: Adjustable system consisting of digital displays detecting sun intensity and responding by automatically adjusting shades.
 - c. Color: As selected by Architect from manufacturer's full range.

4. Crank-Operator Override: Crank and gearbox operate shades in event of power outage or motor failure.
 5. Limit Switches: Adjustable switches interlocked with motor controls and set to stop shades automatically at fully raised and fully lowered positions.
 6. Operating Features:
 - a. Override switch.
- C. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
1. Roller Drive-End Location: Right side of interior face of shade.
 2. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
 3. Shadeband-to-Roller Attachment: Manufacturer's standard method.
- D. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- E. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers that are operated by one roller drive-end assembly.
- F. Shadebands:
1. Shadeband Material: Light-filtering fabric.
 2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
 - a. Type: Enclosed in sealed pocket of shadeband material .
 - b. Color and Finish: As selected by Architect from manufacturer's full range.
- G. Installation Accessories:
1. Exposed Headbox: Rectangular, extruded-aluminum enclosure including front fascia, top and back covers, endcaps, and removable bottom closure.
 - a. Height: Manufacturer's standard in height required to enclose roller and shadeband assembly when shade is fully open, but not less than 3 inches.
 2. Installation Accessories Color and Finish: As selected from manufacturer's full range.
- 2.5 SHADEBAND MATERIALS
- A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - B. Light-Filtering Fabric: Woven fabric, stain and fade resistant.

1. Source: Roller shade manufacturer.
2. Type: Woven polyester and PVC-coated polyester.
3. Weave: Basketweave.
4. Roll Width: width as required, without seams.
5. Orientation on Shadeband: Up the bolt.
6. Openness Factor: 5 percent.
7. Color: As selected by Architect from manufacturer's full range.

2.6 ROLLER SHADE FABRICATION

- A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.
- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:
 1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch per side or 1/2-inch total, plus or minus 1/8 inch. Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch, plus or minus 1/8 inch.
 2. Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.
- C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible, except as follows:
 1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4, provide battens and seams at uniform spacings along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.
 2. Railroaded Materials: Railroad material where material roll width is less than the required width of shadeband and where indicated. Provide battens and seams as required by railroaded material to produce shadebands with full roll-width panel(s) plus, if required, one partial roll-width panel located at top of shadeband.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
- B. Roller Shade Locations: At exterior windows, where indicated on Drawings.

3.3 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

- A. Clean roller shade surfaces, after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motor-operated roller shades.

END OF SECTION 122413

SECTION 123553 – METAL LABORATORY CASEWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Metal laboratory casework.
 - 2. Utility-space closure panels between base cabinets and at exposed ends of utility spaces.
 - 3. Laboratory countertops.
 - 4. Shelves.
 - 5. Accessories.
- B. Related Sections include the following:
 - 1. Section 017419 - Construction and Demolition Waste Management and Disposal
 - 2. Section 018113 “Sustainable Design Requirements” for general, administrative, procedural and product requirements for compliance with requirements of the USGBC’s, LEED for BD & C, Version 4.1.
 - 3. Section 018119 “Construction Indoor Air Quality Requirements” for requirements related to construction indoor air quality.
 - 4. Section 096513 "Resilient Wall Base and Accessories" for resilient base applied to metal laboratory casework.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project’s environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut’s High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project’s target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project’s sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project’s sustainability goals and LEED certification.

1.4 CASEWORK DESIGN REQUIREMENTS

- A. Flush construction: Surfaces of doors, drawers and panel faces shall align with cabinet fronts without overlap of case ends, top or bottom rails. Horizontal and vertical case shell members (panels, top rails and bottoms) shall meet in the same plane without overlap.
- B. Slimline styling: Front width of end panels 3/4" and front height of top and bottom members 1".
- C. Self-supporting units: Completely welded shell assembly without applied panels at ends, backs or bottoms, so that cases can be used interchangeably or as a single, stand-alone unit.
- D. Interior of case units: Easily cleanable, flush interior. Base cabinets, 30" and wider, with double swinging doors shall provide full access to complete interior without center vertical post.
- E. Drawers: Sized on a modular basis for interchange to meet varying storage needs, and designed to be easily removable in field without the use of special tools.
- F. Case openings: Rabbeted-like joints all four sides of case opening for hinged doors and two sides for sliding doors in order to provide dust resistant case.

1.5 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal laboratory casework and support framing capable of withstanding the effects of the following gravity loads and stresses per support framing module without permanent deformation, excessive deflection, or binding of drawers and doors:
 - 1. Steel base unit load capacity: 500 lbs. per lineal foot.
 - 2. Suspended units: 300 lbs.
 - 3. Drawers in a cabinet: 150 lbs.
 - 4. Utility tables (4 legged): 300 lbs.
 - 5. Hanging wall cases: 300 lbs.
 - 6. Load capacity for shelves of base units, wall cases and tall cases: 100 lbs.
- B. Metal Finish Performance Requirements:
 - 1. Abrasion resistance: Maximum weight loss of 5.5 mg. per 100 cycle when tested on a Taber Abrasion Tester #E40101 with 1000 gm wheel pressure and Calibrase #CS10 wheel.
 - 2. Hardness: Surface hardness equivalent to 4H or 5H pencil.
 - 3. Humidity resistance: Withstand 1000 hour exposure in saturated humidity at 100 degrees F.
 - 4. Moisture resistance:
 - a. No visible effects to surface finish after boiling water trickled over test panel inclined at 45 degrees for five minutes.
 - b. No visible effects to surface finish following 100-hour continuous application of a water soaked cellulose sponge, maintained in a wet condition throughout the test period.

5. Adhesion: Score finish surface of test panel with razor blade into 100 squares, 1/16" x 1/16", cutting completely through the finish but with minimum penetration of the substrate, and brush away particles with soft brush. Minimum 95 squares shall maintain their finish.
 6. Salt spray: Withstand minimum 200-hour salt spray test.
- B. Seismic Performance: Provide metal laboratory casework and support framing capable of withstanding the effects of earthquake motions determined according to CSBC and to the criteria indicated on Drawings.
- 1.6 SUBMITTALS
- A. Product Data: For each type of product indicated.
- B. Sustainable Design Submittals:
1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Shop Drawings: For metal laboratory casework. Include plans, elevations, sections, details, and attachments to other work.
1. Indicate locations of blocking and reinforcements required for installing laboratory casework.
 2. Indicate locations and types of service fittings, together with associated service supply connection required.
 3. Include details of utility spaces showing supports for conduits and piping.
 4. Include details of exposed conduits, if required, for service fittings.
 5. Indicate locations of and clearances from adjacent walls, doors, windows, other building components, and other laboratory equipment.
 6. Include coordinated dimensions for laboratory equipment specified in other Sections.
- D. Samples for Initial Selection: For factory-applied finishes, plastic-laminate countertops, epoxy countertops.
- E. Samples for Verification: For each type of finish, including countertop material, in manufacturer's standard sizes.
- F. Qualification Data: For testing agency.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating compliance of laboratory casework finishes and countertops with requirements specified for chemical and physical resistance.

1.7 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency qualified for testing indicated, as documented according to ASTM E 548.
- B. Source Limitations: Obtain laboratory casework, including countertops, sinks, service fittings, and accessories, through one source from a single manufacturer.
 - 1. Obtain through same source from same manufacturer as fume hoods specified in Division 11 Section "Laboratory Fume Hoods."
- C. Product Designations: Drawings indicate sizes and configurations of laboratory casework by referencing designated manufacturer's catalog numbers. Other manufacturers' laboratory casework of similar sizes, similar door and drawer configurations, and complying with the Specifications may be considered. Refer to Division 1 Section "Product Requirements."
- D. Product Standard: Comply with SEFA 8, "Laboratory Furniture--Casework, Shelving and Tables--Recommended Practices."
- E. Flammable Liquid Storage: Where cabinets are indicated for solvent or flammable liquid storage, provide units that are listed and labeled as complying with requirements of NFPA 30 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Cabinets that are not listed and labeled but are constructed according to NFPA 30, Paragraph 4-3.3(b) may be used if acceptable to authorities having jurisdiction.
- F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Schedule delivery of casework and equipment so that spaces are sufficiently complete that material can be installed immediately following delivery.
- B. Protect finished surfaces from soiling or damage during handling and installation. Keep covered with polyethylene film or other protective coating.
- C. Protect all work surfaces throughout construction period with 1/4" corrugated cardboard completely covering the top and securely taped to edges. Mark cardboard in large lettering "No Standing".

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install metal laboratory casework until building is enclosed, wet work and utility roughing-in are complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.9 COORDINATION

- A. Coordinate layout and installation of framing and reinforcements for support of metal laboratory casework.

1.10 EXTRA MATERIALS

- A. Furnish complete touchup kit for each type and color of metal laboratory casework provided. Include fillers, primers, paints, and other materials necessary to perform permanent repairs to damaged laboratory casework finish.
- B. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Cabinet Mounting Clips and Related Hardware: Quantity equal to 5 percent of amount installed, but no fewer than 20 of each type.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
- B. Steel Laboratory Casework Basis-of-Design Product:
 - 1. Design, materials, construction and finish of casework specified is the minimum acceptable standard of quality for steel laboratory casework. The basis of this specification is New England Laboratory Casework Co., Inc. 3 Arrow Drive, Woburn, MA 01801. The steel casework product specified is the "Manchester Series", inset steel construction. Equivalent systems may be submitted for consideration.
 - 2. Acceptable Manufacturers:
 - a. CiF Lab Solutions
 - b. Kewaunee Scientific Corp.
- D. Countertops
 - 3. Phenolic Composite: Solid, high-pressure decorative laminate, complying with NEMA LD 3, Grade CGS

4. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Arborite; a division of ITW Canada.
 - b. Epoxyn Products.
 - c. Formica Corporation.
 - d. Nevamar Company, LLC.
 - e. NuLab Furniture Corporation.
 - f. Panolam Industries International Incorporated; Pionite Decorative Surfaces.
 - g. Trespa North America.

5. Chemical Resistance: Composite countertop material has the following ratings when tested with indicated reagents according to NEMA LD 3, Test Procedure 3.4.5:
 - a. No Effect: Acetic acid (98 percent), acetone, ammonium hydroxide (28 percent), benzene, carbon tetrachloride, dimethyl formamide, ethyl acetate, ethyl alcohol, formaldehyde (37 percent), furfural, hydrochloric acid (37 percent), hydrofluoric acid (48 percent), nitric acid (30 percent), phosphoric acid (85 percent), sodium hydroxide (20 percent), sulfuric acid (33 percent), toluene, and zinc chloride.

6. Color: Black.

2.2 CABINET MATERIALS

- A. Sheet steel: Mild, cold rolled and leveled unfinished steel.
- B. Minimum gauges:
 1. 20 gauge: Interior drawer fronts, scribing strips, filler panels, enclosures, drawer bodies, shelves, security panels and sloping tops.
 2. 18 gauge: Case tops, ends, bottoms, bases, backs, vertical posts, uprights, glazed door members and access panels.
 3. 16 gauge: Top front rails, top rear gussets, intermediate horizontal rails, table legs and frames, leg rails and stretchers.
 4. 14 gauge: Drawer suspensions and front corner reinforcements.
 5. 11 gauge: Table leg corner brackets and gussets for leveling screws.

2.3 CABINET FABRICATION

- A. General: Assemble and finish units at point of manufacture. Use precision dies for interchangeability of like-size drawers, doors, and similar parts. Perform assembly on precision jigs to provide units that are square. Reinforce units with angles, gussets, and channels. Integrally frame and weld to form a dirt and vermin-resistant enclosure. Where applicable, reinforce base cabinets for sink support. Maintain uniform clearance around door and drawer fronts of 1/16 to 3/32 inch (1.5 to 2.4 mm).
- B. Flush Doors: Outer and inner pans that nest into box formation, with full-height channel reinforcements at center of door. Fill doors with noncombustible, sound-deadening material.

- C. Hinged Doors: Mortise for hinges and reinforce with angles welded inside inner pans at hinge edge.
- F. Drawers: Fronts made from outer and inner pans that nest into box formation, with no raw metal edges at top. Sides, back, and bottom fabricated in one piece with rolled or formed top of sides for stiffening and comfortable grasp for drawer removal. Weld drawer front to sides and bottom to form a single, integral unit. Provide drawers with rubber bumpers, ball-bearing slides, and positive stops to prevent metal-to-metal contact or accidental removal.
- F. Adjustable Shelves: Front, back, and ends formed down, with edges returned horizontally at front and back to form reinforcing channels.
- G. Toe Space: Fully enclosed, 4 inches (100 mm) high by 3 inches (75 mm) deep, with no open gaps or pockets.
- H. Table Legs: Welded tubing, not less than 2 inches (50 mm) square with stretchers where needed to comply with product standard. Weld or bolt leg stretchers to legs and cross-stretchers and bolt legs to table aprons. Provide leveling device welded to bottom of each leg.
 - 1. Leg Shoes: Satin-finished stainless steel, open-bottom, slip-on type.
- I. Utilities: Provide space, cutouts, and holes for pipes, conduits, and fittings in cabinet bodies to accommodate utility services and their support-strut assemblies.
 - 1. Base unit backs:
 - a. Provide drawer units with fixed backs.
 - b. Provide cupboard units with removable backs for access to services behind units.
- J. Corner base guards: 4" high #304 stainless steel corner guards.
- K. Filler Strips, End Panels, Kneespace Closure Panels and Utility-Space Closure Panels: Provide as needed to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as cabinets and with hemmed or flanged edges.
- L. Kneespace Apron: 4 ½ inch high apron where no drawers are required.
- M. Ledgers: Provide manufacture's standard formed metal ledgers where countertops and kneespaces abut walls, column enclosures etc.

2.4 CASEWORK SYSTEM

- A. General: Provide casework manufacturer's standard integrated system that includes support framing, suspended modular cabinets, filler and closure panels, countertops, and fittings needed to assemble system. System includes hardware and fasteners for securing support framing to permanent construction.
 - 1. Cabinets can be removed and reinstalled without use of special tools for relocation within system.

2. Base cabinets can be removed without removing or providing temporary support for countertops.
3. Sinks are supported independent of base cabinets.
4. Support framing has provision for fastening pipe supports at utility space in not more than 1-inch (25-mm) increments.
5. System includes filler and closure panels to close spaces between support framing, cabinets, shelves, countertops, floors, and walls, unless otherwise indicated. Fabricate panels from same material and with same finish as cabinets and with hemmed or flanged edges.

2.5 METAL CABINET FINISH

A. Metal finish:

1. Preparation: Spray clean metal with a heated cleaner/phosphate solution, pretreat with iron phosphate spray, water rinse, and neutral final seal. Immediately dry in heated ovens, gradually cooled, prior to application of finish.
2. Application: Electrostatically apply urethane powder coat of selected color and bake in controlled high temperature oven to assure a smooth, hard satin finish. Surfaces shall have a chemical resistant, high grade laboratory furniture quality finish of the following thickness:
 - a. Exterior and interior exposed surfaces: 1.5 mil average and 1.2 mil min.
 - b. Backs of cabinets and other surfaces not exposed to view: 1.0 mil avg.

B. Chemical Resistance:

1. Test procedure: A finished test panel shall be laid flat and level on a horizontal surface. Chemical spot tests shall be made by applying 10 drops (approximately 0.5 cm³) of each reagent identified to the surface to be tested. Each reagent spot shall be open to the atmosphere. Ambient temperature shall be 68 -72 (20-22.2 C). After a test period of one hour, chemicals shall be flushed away with cold water and the surface washed with detergent, warm water at 150 F (65.5 C) and alcohol to remove surface stains. Surface shall be examined under 100 foot candles of illumination.
2. Evaluation ratings: Change in surface finish and function shall be described by the following ratings:
 - a. No Effect: No detectable change of finish film.
 - b. Excellent: Indicates excellent to superior integrity of finish film. Includes no effect or slight change in gloss and slight discoloration.
 - c. Good: Allows change of gloss or discoloration or surface discoloration while retaining integrity of finish film.
 - d. Fair: Objectionable changes in appearance due to slight swelling or change in gloss while retaining integrity of finish film.
 - e. Poor: Obvious and significant deterioration including pitting or erosion of finish material.
3. Test results (concentration by weight) Contrast Inset Steel Casework: (based on Chameleon - CH color)
4. Manufacturer to provide "Independent" and "Certified" performance finish test results for specified finish color, with submittal of compliance statement.

| <u>CHEMICAL</u> | <u>RATING</u> |
|-------------------------------|------------------------|
| a. Acetic Acid-Glacial, 98% | Excellent-sl shadow |
| b. Formic Acid, 90% | No Effect |
| c. Hydrochloric Acid, 37% | Excellent-sl shadow |
| d. Hydroflouric Acid, 48% | Excellent-sl shadow |
| e. Nitric Acid, 25% | No Effect |
| f. Nitric Acid, 60% | Excellent-sl yellowing |
| g. Phosphoric Acid, 75% | No Effect |
| h. Sulfuric Acid, 25% | No Effect |
| i. Sulfuric Acid, 85% | Excellent-sl shadow |
| j. Ammonium Hydroxide, 28% | No Effect |
| k. Sodium Hydroxide, 20% | No Effect |
| l. Sodium Hydroxide, 40% | No Effect |
| m. Acetone | Excellent-sl shadow |
| n. Sodium Hypochlorite, 5.25% | No Effect |
| o. Ethyl Acetate | Excellent-sl shadow |
| p. Ethyl Alcohol | No Effect |
| q. Ethyl Ether | No Effect |
| r. Formaldehyde, 37% | No Effect |
| s. Hydrogen Peroxide, 30% | No Effect |
| t. Methylene Ketone | Excellent-sl shadow |
| u. Phenol, 85% | Excellent-sl shadow |
| v. Xylene | Excellent-sl shadow |
| x. Naphthalene | No Effect |
| y. Silver Nitrate, Saturated | No Effect |

5. Colors for Metal Laboratory Casework Finish: As selected by Architect from manufacturer's full range.

2.6 CABINET HARDWARE

- A. General: Provide laboratory casework manufacturer's standard satin-finish, commercial-quality, heavy-duty hardware complying with requirements indicated for each type.
- B. Hinges: Stainless-steel, 5-knuckle hinges complying with BHMA A156.9, Grade 1, with anti-friction bearings and rounded tips. Provide 2 for doors 48 inches (1200 mm) or less in height and 3 for doors more than 48 inches (1200 mm) in height.
- C. Pulls: Solid aluminum; fastened from back with two screws. Provide 2 pulls for drawers more than 24 inches (600 mm) in width.
- D. Door Catches: Nylon-roller spring catch or dual, self-aligning, permanent magnet catch. Provide 2 catches on doors more than 48 inches (1200 mm) in height.
- E. Drawer Slides: Powder-coated, full-extension, self-closing, heavy-duty drawer slides; designed to prevent rebound when drawers are closed; with nylon-tired, ball-bearing rollers; complying with BHMA A156.9, Type B05091, and rated for 150 lbf (670 N).

- F. Locks: Cam or half-mortise type with 5-disc tumbler, brass with chrome-plated finish; complying with BHMA A156.11, Type E07281, E07111, or E07021.
 - 1. Provide minimum of two keys per lock and two master keys.
 - 2. Provide on all drawers and doors.

2.7 ACCESSORIES

- A. Reagent Shelves: Provide single-faced at wall benches, double-faced at center or peninsula benches as indicated.
 - 1. Provide open fronts, height and depth of units as shown on Drawings.
 - 2. Uprights: 1-1/2" and 6" thick, double wall construction of cold rolled steel. Include access panel on inside of upright for access to fasteners to countertop and provide channel shaped molding of non-absorbent vinyl at base of upright.
 - 3. Finish on metal uprights: epoxy powder coat, complying with BHMA A156.9, Types B04102 and B04112. Color selected by Owner and Architect from manufacturer's full line.
 - 4. Shelf Material: Solid phenolic resin
- B. Adjustable Wall Shelf Supports: Surface-type steel standards and steel shelf brackets, with epoxy powder-coated finish, complying with BHMA A156.9, Types B04102 and B04112.
 - 1. Shelf Material: Chemical resistant plastic Laminate. Color: To be selected from manufacturer's full range.
- C. Deck Mounted Outlet: Provide manufacturer's standard deck mounted quad-box outlet, where indicated. Coordinate electrical requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of reinforcements, and other conditions affecting performance of metal laboratory casework.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF CABINETS

- A. Install level, plumb, and true; shim as required, using concealed shims. Where laboratory casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- B. Utility-Space Framing: Secure to floor with two fasteners at each frame. Fasten to partition framing, wood blocking, or metal reinforcements in partitions and to base cabinets.

- C. Base Cabinets: Adjust top rails and subtops within 1/16 inch (1.5 mm) of a single plane. Fasten cabinets to utility-space framing, partition framing, wood blocking, or reinforcements in partitions with fasteners spaced not more than 24 inches (600 mm) o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16 inch (1.5 mm).
 - 1. Where base cabinets are installed away from walls, fasten to floor at toe space at not more than 24 inches (600 mm) o.c. and at sides of cabinets with not less than 2 fasteners per side.
- D. Wall Cabinets: Adjust fronts and bottoms within 1/16 inch (1.5 mm) of a single plane. Fasten to hanging strips, masonry, partition framing, blocking, or reinforcements in partitions. Fasten each cabinet through back, near top, at not less than 24 inches (600 mm) o.c. Align similar adjoining doors to a tolerance of 1/16 inch (1.5 mm).
- E. Install hardware uniformly and precisely. Set hinges snug and flat in mortises.
- F. Adjust laboratory casework and hardware so doors and drawers align and operate smoothly without warp or bind and contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.

3.3 INSTALLATION OF COUNTERTOPS

- A. Abut top and edge surfaces in one true plane with flush hairline joints and with internal supports placed to prevent deflection. Locate joints only where shown on Shop Drawings.
- B. Field Jointing: Where possible, make in the same manner as shop jointing using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop.
 - 1. Use concealed clamping devices for field joints in plastic-laminate countertops. Locate clamping devices within 6 inches (150 mm) of front and back edges and at intervals not exceeding 24 inches (600 mm). Tighten according to manufacturer's written instructions to exert a uniform heavy pressure at joints.
- C. Fastening:
 - 1. Secure countertops, except for epoxy countertops, to cabinets with Z-type fasteners or equivalent, using two or more fasteners at each cabinet front, end, and back.
 - 2. Secure epoxy countertops to cabinets with epoxy cement, applied at each corner and along perimeter edges at not more than 48 inches (1200 mm) o.c., except at locations indicated to be removable to meet University Lab Accessibility Standards. At removable countertops, use silicone sealant as shown on Drawings.
 - 3. Where necessary to penetrate countertops with fasteners, countersink heads approximately 1/8 inch (3 mm) and plug hole flush with material equal to countertop in chemical resistance, hardness, and appearance.
- D. Provide required holes and cutouts for service fittings.

- E. Seal unfinished edges and cutouts in plastic-laminate countertops with heavy coat of polyurethane varnish.
- F. Provide scribe moldings for closures at junctures of countertop, curb, and splash, with walls as recommended by manufacturer for materials involved. Match materials and finish to adjacent laboratory casework. Use chemical-resistant, permanently elastic sealing compound where recommended by manufacturer.
- G. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

3.4 INSTALLATION OF SINKS

- A. Refer to sinks as specified in Section 15, "Plumbing Fixtures".
- B. Semiflush Installation of Stainless-Steel Sinks: Before setting Sinks which are not factory installed, apply sink and countertop manufacturers' recommended sealant under rim lip and along top. Remove excess sealant while still wet and finish joint for neat appearance.

3.5 INSTALLATION OF ACCESSORIES

- A. Install accessories according to Shop Drawings and manufacturer's written instructions.
- B. Securely fasten adjustable shelving supports, stainless-steel shelves, and pegboards to partition framing, wood blocking, or reinforcements in partitions.
- C. Install shelf standards plumb and at heights to align shelf brackets for level shelves. Install shelving level and straight, closely fitted to other work where indicated.

3.6 INSTALLATION OF SERVICE FITTINGS

- A. Comply with requirements in Divisions 22 and 26 Sections for installing water and laboratory service fittings, piping, electrical devices, and wiring.
- B. Install fittings according to Shop Drawings and manufacturer's written instructions. Set bases and flanges of sink- and countertop-mounted fittings in sealant recommended by manufacturer of sink or countertop material. Securely anchor fittings, piping, and conduit to laboratory casework, unless otherwise indicated.

3.7 CLEANING AND PROTECTING

- A. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

- B. Protect countertop surfaces during construction with 6-mil plastic or other suitable water-resistant covering. Tape to underside of countertop at minimum of 48 inches o.c.

END OF SECTION 123553

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SECTION 123623 - PLASTIC-LAMINATE-CLAD COUNTERTOPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes

- 1. Plastic-laminate-clad countertops.

B. Related Sections include the following:

- 1. Section 017419 - Construction and Demolition Waste Management and Disposal
- 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
- 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.
- 4. Section 064116 "Plastic Laminate Clad Architectural Cabinets" for base cabinets to receive countertops.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- B. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Shop Drawings: For plastic-laminate-clad countertops.
 - 1. Include plans, sections, details, and attachments to other work. Detail fabrication and installation, including field joints.
 - 2. Show locations and sizes of cutouts and holes for items installed in plastic-laminate-clad countertops.
- D. Samples: Plastic laminates in each type, color, pattern, and surface finish required in manufacturer's standard size.
- E. Samples for Initial Selection: For plastic laminates and wood edges.
- F. Samples for Verification: As follows:
 - 1. Plastic Laminates: For each type, color, pattern, and surface finish required, 8 by 10 inches in size.
 - 2. Fabrication Sample: For each type and profile of countertop required, provide one sample applied to core material with specified edge material applied to one edge.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer fabricator.
- B. Product Certificates: For the following:
 - 1. Composite wood and agrifiber products.
 - 2. High-pressure decorative laminate.
 - 3. Adhesives.
- C. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

1. Shop Experience: A minimum of ten years of successful experience with projects similar in nature, or AWI's Quality Certification Program accredited participant, or WI's Certified Compliance Program licensee.

B. Installer Qualifications: Same as manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver countertops only after casework and supports on which they will be installed have been completed in installation areas.

B. Store countertops in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

C. Keep surfaces of countertops covered with protective covering during handling and installation.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install countertops until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.

B. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Established Dimensions: Where countertops are indicated to fit to other construction, establish dimensions for areas where countertops are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 FABRICATORS

- A. Fabricators: Subject to compliance with requirements, manufacturer shall be located within 100-miles of the Project Location.
- A. PLASTIC-LAMINATE-CLAD COUNTERTOPS
- B. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of plastic-laminate-clad countertops indicated for construction, finishes, installation, and other requirements.
- C. Grade: Custom.
- D. High-Pressure Decorative Laminate: NEMA LD 3, Grade HGS.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Formica Corporation.
 - b. Pionite; a Panolam Industries International, Inc. brand.
 - c. Wilsonart LLC.
- E. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. As selected by Architect from manufacturer's full range in the following categories:
 - a. Solid colors or Patterns, matte finish.
- F. Edge Treatment:
 - 1. Where indicated, provide bullnose edge for transparent finish.
 - a. Species to be clear maple at the Upper Level
 - b. Species to be clear red oak at the Lower Level.
 - 2. At plastic laminate edges: Grade HGS
- G. Core Material: Straw-based particleboard.
- H. Core Material at Sinks: Particleboard made with exterior glue.
- I. Core Thickness: 3/4 inch.
 - 1. Build up countertop thickness to 1-1/2 inches at front, back, and ends with additional layers of core material laminated to top.

- J. Backer Sheet: Provide plastic-laminate backer sheet, NEMA LD 3, Grade BKL, on underside of countertop substrate.
- K. Paper Backing: Provide paper backing on underside of countertop substrate.

2.3 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard unless otherwise indicated.
 - 1. Wood Moisture Content: 8 to 13 percent.
- B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of countertop and quality grade specified unless otherwise indicated.
 - 1. Straw-Based Particleboard: ANSI A208.1, Grade M-2, except for density.
 - a. Manufacturers: Subject to compliance with requirements available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Panel Source International, Inc.
 - 2) Sorm Incorporated.
 - 3) Chesapeake Plywood, LLC

2.4 ACCESSORIES

- A. Wire-Management Grommets: Circular, molded-plastic grommets and matching plastic caps with slot for wire passage.
 - 1. Outside Diameter: 2 inches.
 - 2. Color: Black
 - 3. Quantity and Location: Provide one grommet for every 2-feet of countertop.
- B. Paper Slots: 12 inches long by 1-3/4 inches wide by 1 inch deep; molded-plastic, paper-slot liner with 1/4-inch lip.
 - 1. Color: Black.
- C. Trash Grommet: 10" diameter by 1" deep; molded-plastic, trash grommet with 1/4" lip.
 - 1. Color: Black

2.5 MISCELLANEOUS MATERIALS

- A. Adhesive for Bonding Plastic Laminate: As selected by fabricator to comply with requirements.

2.6 FABRICATION

- A. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch over base cabinets. Ease edges to radius indicated for the following:
 - 1. Solid-Wood (Lumber) Members: 1 ½" bullnose, tongue and groove to edge of countertop.
- B. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
 - 1. Notify Architect seven days in advance of the dates and times countertop fabrication will be complete.
 - 2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended, and check measurements of assemblies against field measurements before disassembling for shipment.
- C. Shop cut openings to maximum extent possible to receive appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately, and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
 - 1. Seal edges of cutouts by saturating with varnish.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.
- B. Before installing countertops, examine shop-fabricated work for completion and complete work as required, including removal of packing.

3.2 INSTALLATION

- A. Grade: Install countertops to comply with same grade as item to be installed.

- B. Assemble countertops and complete fabrication at Project site to the extent that it was not completed in the shop.
 - 1. Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately, and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
 - 2. Seal edges of cutouts by saturating with varnish.
- C. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.
- D. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Countertop Installation: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
 - 1. Install countertops level and true in line. Use concealed shims as required to maintain not more than a 1/8-inch-in-96-inches variation from a straight, level plane.
 - 2. Secure backsplashes to walls with adhesive.
 - 3. Seal joints between countertop and backsplash, if any, and joints where countertop and backsplash abut walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects. Where not possible to repair, replace countertops. Adjust joinery for uniform appearance.
- B. Clean countertops on exposed and semiexposed surfaces.
- C. Protection: Provide Kraft paper or other suitable covering over countertop surfaces, taped to underside of countertop at a minimum of 48 inches o.c. Remove protection at Substantial Completion.

END OF SECTION 123623

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SECTION 124813 - ENTRANCE FLOOR MATS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Resilient entrance mats.
- 2. Recessed frames.

- A. Related Requirements:

- 1. Section 017419 - Construction and Demolition Waste Management and Disposal
- 2. Section 018113 "Sustainable Design Requirements" for general, administrative, procedural and product requirements for compliance with requirements of the USGBC's, LEED for BD & C, Version 4.1.
- 3. Section 018119 "Construction Indoor Air Quality Requirements" for requirements related to construction indoor air quality.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- B. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.4 COORDINATION

- A. Coordinate size and location of recesses in concrete to receive floor mats and frames.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for floor mats and frames.
- B. Sustainable Design Submittals:
 - 1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.
- C. Shop Drawings:
 - 1. Divisions between mat sections.
 - 2. Perimeter floor frames.
- D. Samples: For the following products, in manufacturer's standard sizes:
 - 1. Floor Mat: Assembled sections of floor mat.
 - 2. Tread Rail: Sample of each type and color.
 - 3. Frame Members: Sample of each type and color.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For floor mats and frames to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2–PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 ENTRANCE FLOOR MATS AND FRAMES, GENERAL

- A. Structural Performance: Provide roll-up rail mats and frames capable of withstanding the following loads and stresses within limits and under conditions indicated:
 - 1. Uniform floor load of 300 lbf/sq. ft.
 - 2. Wheel load of 350 lb per wheel.

- B. Accessibility Standard: Comply with applicable provisions in the DOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

2.3 ROLL-UP RAIL MATS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Balco; a CSW Industrials Company.
 - 2. C/S Group.
 - 3. Reese Enterprises, Inc.
- B. Roll-up, Aluminum-Rail Hinged Mats: Extruded-aluminum tread rails 2 inches wide by 3/8-inch-thick, sitting on continuous vinyl cushions.
 - 1. Tread Inserts: Textured-surface, resilient vinyl.
 - 2. Colors, Textures, and Patterns of Inserts: As selected by Architect from standard range of industry colors.
 - 3. Rail Color: Mill finish.
 - 4. Hinges: Aluminum.
 - 5. Mat Size: As indicated.

2.4 FRAMES

- A. Recessed Frames: Manufacturer's standard extrusion.
 - 1. Extruded Aluminum: ASTM B221, Alloy 6061-T6 or Alloy 6063-T5, T6, or T52.
 - a. Color: Mill.

2.5 FABRICATION

- A. Floor Mats: Shop fabricate units to greatest extent possible in sizes indicated. Unless otherwise indicated, provide single unit for each mat installation; do not exceed manufacturer's recommended maximum sizes for units that are removed for maintenance and cleaning. Where joints in mats are necessary, space symmetrically and away from normal traffic lanes. Miter corner joints in framing elements with hairline joints or provide prefabricated corner units without joints.
- B. Recessed Frames: As indicated, for permanent recessed installation, complete with corner pins or reinforcement and anchorage devices.
 - 1. Fabricate edge-frame members in single lengths or, where frame dimensions exceed maximum available lengths, provide minimum number of pieces possible, with hairline joints equally spaced and pieces spliced together by straight connecting pins.

- C. Coat concealed surfaces of aluminum frames that contact cementitious material with manufacturer's standard protective coating.

2.6 ALUMINUM FINISHES

- A. Mill finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and floor conditions for compliance with requirements for location, sizes, recess depth, and other conditions affecting installation of floor mats and frames.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install recessed mat frames and mats to comply with manufacturer's written instructions so that tops of mats will be flush with adjoining finished flooring. Set mats with tops at height recommended by manufacturer for most effective cleaning action; coordinate tops of mat surfaces with bottoms of doors that swing across mats to provide clearance between door and mat.
 - 1. Delay setting mats until construction traffic has ended.

3.3 PROTECTION

- A. After completing frame installation and concrete work, provide temporary filler of plywood or fiberboard in recesses and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and Project is near Substantial Completion.

END OF SECTION 124813

SECTION 133419 - METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Structural-steel framing.
2. Metal roof panels.
3. Metal wall panels.
4. Metal soffit panels.
5. Thermal insulation.
6. Personnel doors and frames.
7. Windows.
8. Accessories.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for foundations.
2. Section 054000 "Cold-Formed Metal Framing" for mechanical mezzanine framing.
3. Section 042200 "Concrete Unit Masonry" for base of wall masonry.
4. Section 083323 "Overhead Coiling Doors" for coiling vehicular doors in metal building systems.
5. Section 081113 "Hollow Metal Doors and Frames."
6. Section 087100 "Hardware" for hardware to be provided for doors specified in this section.

C. INTENT

1. The intent of the steel structure herein specified is to provide the project with a complete, fully Code-compliant and functional building. Nothing specified in this Section is intended to create a custom condition for any particular manufacturer. Subject to compliance with requirements, modifications to the specification can be made as part of the Delegated Design submission, provided the building provides equivalent area, volume, function and features as indicated.

1.3 DEFINITIONS

- A. Terminology Standard: See MBMA's "Metal Building Systems Manual" for definitions of terms for metal building system construction not otherwise defined in this Section or in standards referenced by this Section.

1.4 COORDINATION

- A. Coordinate sizes and locations of concrete foundations and casting of anchor-rod inserts into foundation walls and footings. Anchor rod installation, concrete, reinforcement, and formwork requirements are specified in Section 033000 "Cast-in-Place Concrete."
- B. Coordinate metal panel assemblies with rain drainage work, flashing, trim, and construction of supports and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to metal building systems including, but not limited to, the following:
 - a. Condition of foundations and other preparatory work performed by other trades.
 - b. Structural load limitations.
 - c. Construction schedule. Verify availability of materials and erector's personnel, equipment, and facilities needed to make progress and avoid delays.
 - d. Required tests, inspections, and certifications.
 - e. Unfavorable weather and forecasted weather conditions and impact on construction schedule.
 - 2. Review methods and procedures related to metal roof panel assemblies including, but not limited to, the following:
 - a. Compliance with requirements for purlin and rafter conditions, including flatness and attachment to structural members.
 - b. Structural limitations of purlins and rafters during and after roofing.
 - c. Flashings, special roof details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect metal roof panels.
 - d. Temporary protection requirements for metal roof panel assembly during and after installation.
 - e. Roof observation and repair after metal roof panel installation.
 - 3. Review methods and procedures related to metal wall panel assemblies including, but not limited to, the following:
 - a. Compliance with requirements for support conditions, including alignment between and attachment to structural members.

- b. Structural limitations of girts and columns during and after wall panel installation.
- c. Flashings, special siding details, wall penetrations, openings, and condition of other construction that will affect metal wall panels.
- d. Temporary protection requirements for metal wall panel assembly during and after installation.
- e. Wall observation and repair after metal wall panel installation.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of metal building system component.

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
 - a. Metal roof panels.
 - b. Metal wall panels.
 - c. Metal soffit panels.
 - d. Thermal insulation and vapor-retarder facings.
 - e. Personnel doors and frames.
 - f. Windows.
 - g. Louvers.

B. Shop Drawings: Indicate components by others. Include full building plan, elevations, sections, details and the following:

- 1. Anchor-Rod Plans: Submit anchor-rod plans and templates before foundation work begins. Include location, diameter, and minimum required projection of anchor rods required to attach metal building to foundation. Indicate column reactions at each location.
- 2. Structural-Framing Drawings: Show complete fabrication of primary and secondary framing; include provisions for openings. Indicate welds and bolted connections, distinguishing between shop and field applications. Include transverse cross-sections.
 - a. Show provisions for attaching mezzanines, roof curbs, pipe racks and equipment supports.
- 3. Metal Roof and Wall Panel Layout Drawings: Show layouts of panels including methods of support. Include details of edge conditions, joints, panel profiles, corners, anchorages, clip spacing, trim, flashings, closures, and special details. Distinguish between factory- and field-assembled work; show locations of exposed fasteners.
 - a. Show roof-mounted items including roof hatches, equipment supports, pipe supports and penetrations, lighting fixtures, and items mounted on roof curbs.
 - b. Show wall-mounted items including personnel doors, vehicular doors, windows, louvers, and lighting fixtures.
 - c. Show translucent panels.

4. Accessory Drawings: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches:
 - a. Flashing and trim.
 - b. Gutters.
 - c. Downspouts.
 - d. Service walkways.
 - C. Samples for Initial Selection: For units with factory-applied finishes.
 - D. Samples for Verification: For the following products:
 1. Panels: Nominal 12 inches long by actual panel width. Include fasteners, closures, and other exposed panel accessories.
 2. Flashing and Trim: Nominal 12 inches long. Include fasteners and other exposed accessories.
 3. Vapor-Retarder Facings: Nominal 6-inch-square Samples.
 4. Windows: Full-size, nominal 12-inch-long frame Samples showing typical profile.
 5. Accessories: Nominal 12-inch-long Samples for each type of accessory.
 - E. Door Schedule: For doors and frames. Use same designations indicated on Drawings. Include details of reinforcement.
 1. Door Hardware Schedule: Include details of fabrication and assembly of door hardware. Organize schedule into door hardware sets indicating complete designations of every item required for each door or opening.
 2. Keying Schedule: Detail Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.
 - F. Delegated-Design Submittal: For metal building systems.
 1. Include analysis data indicating compliance with performance requirements and design data signed and sealed by the qualified professional engineer responsible for their preparation.
- 1.7 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For erector and manufacturer.
 - B. Welding certificates.
 - C. Letter of Design Certification: Signed and sealed by a qualified professional engineer. Include the following:
 1. Name and location of Project.
 2. Order number.
 3. Name of manufacturer.
 4. Name of Contractor.

5. Building dimensions including width, length, height, and roof slope.
 6. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.
 7. Governing building code and year of edition.
 8. Design Loads: Include dead load, roof live load, collateral loads, roof snow load, deflection, wind loads/speeds and exposure, seismic design category or effective peak velocity-related acceleration/peak acceleration, and auxiliary loads (cranes).
 9. Load Combinations: Indicate that loads were applied acting simultaneously with concentrated loads, according to governing building code.
 10. Building-Use Category: Indicate category of building use and its effect on load importance factors.
- D. Erector Certificates: For qualified erector, from manufacturer.
- E. Material Test Reports: For each of the following products:
1. Structural steel including chemical and physical properties.
 2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 3. Tension-control, high-strength, bolt-nut-washer assemblies.
 4. Shop primers.
 5. Nonshrink grout.
- F. Source quality-control reports.
- G. Field quality-control reports.
- H. Surveys: Show final elevations and locations of major members. Indicate discrepancies between actual installation and the Contract Documents. Have surveyor who performed surveys certify their accuracy.
- I. Sample Warranties: For special warranties.
- 1.8 CLOSEOUT SUBMITTALS
- A. Maintenance Data: For metal panel finishes and door hardware to include in maintenance manuals.
- 1.9 QUALITY ASSURANCE
- A. Manufacturer Qualifications: A qualified manufacturer.
1. Accreditation: Manufacturer's facility accredited according to the International Accreditation Service's AC472, "Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems."
 2. Engineering Responsibility: Preparation of comprehensive engineering analysis and Shop Drawings by a professional engineer who is legally qualified to practice in jurisdiction where Project is located.

- B. Erector Qualifications: An experienced erector who specializes in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.
- C. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.3, "Structural Welding Code - Sheet Steel."
- D. Land Surveyor Qualifications: A professional land surveyor who practices in jurisdiction where Project is located and who is experienced in providing surveying services of the kind indicated.
- E. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Build mockup of typical wall area as shown on Drawings.
 - 2. Build mockups for typical wall metal panel including accessories.
 - a. Size: 48 inches long by 48 inches.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, sheets, panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Protect foam-plastic insulation as follows:
 - 1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
 - 2. Protect against ignition at all times. Do not deliver foam-plastic insulation materials to Project site before installation time.
 - 3. Complete installation and concealment of foam-plastic materials as rapidly as possible in each area of construction.

1.11 FIELD CONDITIONS

- A. Weather Limitations: Proceed with panel installation only when weather conditions permit metal panels to be installed according to manufacturers' written instructions and warranty requirements.

1.12 WARRANTY

- A. Special Warranty on Metal Panel Finishes: Manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.
- B. Special Weathertightness Warranty for Standing-Seam Metal Roof Panels: Manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that leak or otherwise fail to remain weathertight within specified warranty period.
 - 1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Butler Manufacturing Company; a division of BlueScope Buildings North America, Inc.
 - 2. Delta Steel Building Company
 - 3. Nucor Building Systems.
 - 4. Varco-Pruden Buildings; a division of BlueScope Buildings North America, Inc.
- B. Source Limitations: Obtain metal building system components, including primary and secondary framing and metal panel assemblies, from single source from single manufacturer.

2.2 SYSTEM DESCRIPTION

- A. Provide a complete, integrated set of mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced

movement, and exposure to weather without failure or infiltration of water into building interior.

- B. Primary-Frame Type:
 - 1. Rigid Clear Span: Solid-member, structural-framing system without interior columns.
- C. End-Wall Framing: Manufacturer's standard, for buildings not required to be expandable, consisting of primary frame, capable of supporting one-half of a bay design load, and end-wall columns.
- D. Secondary-Frame Type: Manufacturer's standard purlins and joists and exterior-framed (bypass) girts.
- E. Eave Height: Manufacturer's Standard, but not less than 16 feet.
- F. Bay Spacing: As indicated on Drawings.
- G. Roof Slope: Manufacturer's standard for frame type required, but not shallower than 2 inch per 12 inches.
- H. Roof System: Manufacturer's standard standing-seam, vertical-rib metal roof panels.
- I. Exterior Wall System: Manufacturer's standard exposed-fastener, tapered-rib metal wall panels.

2.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, licensed in the State of Connecticut, to design metal building system in its entirety. Submit signed and sealed documents for Permit approval as part of the Shop Drawing Submission. Design shall incorporate all related systems and assemblies to ensure compatibility and coordination throughout the structure.
- B. Structural Performance: Metal building systems shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to procedures in MBMA's "Metal Building Systems Manual."
 - 1. Design Loads: As indicated on Drawings.
 - 2. Deflection and Drift Limits: Design metal building system assemblies to withstand serviceability design loads without exceeding deflections and drift limits recommended in AISC Steel Design Guide No. 3 "Serviceability Design Considerations for Steel Buildings."
 - 3. Deflection and Drift Limits: No greater than the following:
 - a. Purlins and Rafters: Vertical deflection of 1/240 of the span.
 - b. Girts: Horizontal deflection of 1/180 of the span.
 - c. Metal Roof Panels: Vertical deflection of 1/240 of the span.
 - d. Metal Wall Panels: Horizontal deflection of 1/240 of the span.

- e. Design secondary-framing system to accommodate deflection of primary framing and construction tolerances, and to maintain clearances at openings.
 - f. Lateral Drift: Maximum of 1/200 of the building height.
- C. Seismic Performance: Metal building system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
- 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces
- E. Fire Propagation Characteristics: Exterior wall assemblies containing foam plastics pass NFPA 285 fire test.
- F. Structural Performance for Metal Roof and Wall Panels: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:
- 1. Wind Loads: As indicated on Drawings.
- G. Air Infiltration for Metal Roof Panels: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E1680 or ASTM E283 at the following test-pressure difference:
- 1. Test-Pressure Difference: 1.57 lbf/sq. ft..
- H. Air Infiltration for Metal Wall Panels: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E283 at the following test-pressure difference:
- 1. Test-Pressure Difference: 1.57 lbf/sq. ft..
- I. Water Penetration for Metal Roof Panels: No water penetration when tested according to ASTM E1646 at the following test-pressure difference:
- 1. Test-Pressure Difference: 6.24 lbf/sq. ft..
- J. Water Penetration for Metal Wall Panels: No water penetration when tested according to ASTM E331 at the following test-pressure difference:
- 1. Test-Pressure Difference: 6.24 lbf/sq. ft..
- K. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
- 1. Uplift Rating: UL 90.
- L. FM Global Listing: Provide metal roof panels and component materials that comply with requirements in FM Global 4471 as part of a panel roofing system and that are listed in FM

Global's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Global markings.

1. Fire/Windstorm Classification: Class 1A-75.
2. Hail Resistance: MH.

M. Energy Star Listing: Roof panels that are listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.

N. Energy Performance: Provide roof panels according to one of the following when tested according to CRRC-1:

1. Three-year, aged, solar reflectance of not less than 0.55 and emissivity of not less than 0.75.
2. Three-year, aged, Solar Reflectance Index of not less than 64 when calculated according to ASTM E1980.

O. Thermal Performance for Opaque Elements: Provide the following maximum U-factors and minimum R-values when tested according to ASTM C1363 or ASTM C518:

1. Mezzanine Ceiling:
 - a. R-Value: R-19 + R-11 Liner System
2. Roof:
 - a. R-Value: R-11 Liner System.
3. Walls at Area of Shop:
 - a. R-Value: R-13 + R-13 continuous insulation.
4. Walls at Area of Shop:
 - a. R-Value: R-13.

2.4 STRUCTURAL-STEEL FRAMING

- A. Structural Steel: Comply with AISC 360, "Specification for Structural Steel Buildings."
- B. Bolted Connections: Comply with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
- C. Cold-Formed Steel: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" for design requirements and allowable stresses.
- D. Primary Framing: Manufacturer's standard primary-framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse and lean-to

frames; rafters, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing.

1. General: Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly. Provide frame span and spacing indicated.
 - a. Slight variations in span and spacing may be acceptable if necessary, to comply with manufacturer's standard, as approved by Architect.
 2. Rigid Clear-Span Frames: I-shaped frame sections fabricated from shop-welded, built-up steel plates or structural-steel shapes. Interior columns are not permitted.
 3. Frame Configuration: Single gable.
 4. Exterior Column: Uniform depth or Tapered.
 5. Rafter: Uniform depth or Tapered.
- E. End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for field-bolted assembly to comply with the following:
1. End-Wall and Corner Columns: I-shaped sections fabricated from structural-steel shapes; shop-welded, built-up steel plates; or C-shaped, cold-formed, structural-steel sheet.
 2. End-Wall Rafters: C-shaped, cold-formed, structural-steel sheet; or I-shaped sections fabricated from shop-welded, built-up steel plates or structural-steel shapes.
- F. Secondary Framing: Manufacturer's standard secondary framing, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Unless otherwise indicated, fabricate framing from either cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet, prepainted with coil coating, to comply with the following:
1. Purlins: C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; minimum 2-1/2-inch-wide flanges.
 - a. Depth: As needed to comply with system performance requirements.
 2. Girts: C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes. Form ends of Z-sections with stiffening lips angled 40 to 50 degrees from flange, with minimum 2-1/2-inch-wide flanges.
 - a. Depth: As required to comply with system performance requirements.
 3. Eave Struts: Unequal-flange, C-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; to provide adequate backup for metal panels.
 4. Flange Bracing: Minimum 2-by-2-by-1/8-inch structural-steel angles or 1-inch-diameter, cold-formed structural tubing to stiffen primary-frame flanges.
 5. Sag Bracing: Minimum 1-by-1-by-1/8-inch structural-steel angles.
 6. Base or Sill Angles: Manufacturer's standard base angle, minimum 3-by-2-inch, fabricated from zinc-coated (galvanized) steel sheet.
 7. Purlin and Girt Clips: Manufacturer's standard clips fabricated from steel sheet. Provide galvanized clips where clips are connected to galvanized framing members.

8. Framing for Openings: Channel shapes; fabricated from cold-formed, structural-steel sheet or structural-steel shapes. Frame head and jamb of door openings and head, jamb, and sill of other openings.
 9. Miscellaneous Structural Members: Manufacturer's standard sections fabricated from cold-formed, structural-steel sheet; built-up steel plates; or zinc-coated (galvanized) steel sheet; designed to withstand required loads.
- G. Bracing: Provide adjustable wind bracing, coordinated with openings. Cables or rods must be clear of doors, but may pass in front of windows if required. Relocation of man-doors is acceptable if required. Overhead coiling doors cannot be relocated and shall use rigid frames if necessary. Use any method as follows:
1. Rods: ASTM A36/A36M; ASTM A572/A572M, Grade 50; or ASTM A529/A529M, Grade 50; minimum 1/2-inch-diameter steel; threaded full length or threaded a minimum of 6 inches at each end.
 2. Cable: ASTM A475, minimum 1/4-inch-diameter, extra-high-strength grade, Class B, zinc-coated, seven-strand steel; with threaded end anchors.
 3. Angles: Fabricated from structural-steel shapes to match primary framing, of size required to withstand design loads.
 4. Rigid Portal Frames: Fabricated from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.
 5. Fixed-Base Columns: Fabricated from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.
 6. Diaphragm Action of Metal Panels: Design metal building to resist wind forces through diaphragm action of metal panels.
- H. Anchor Rods: Headed anchor rods as indicated in Anchor Rod Plan for attachment of metal building to foundation.
- I. Materials:
1. W-Shapes: ASTM A992/A992M; ASTM A572/A572M, Grade 50 or 55; or ASTM A529/A529M, Grade 50 or 55.
 2. Channels, Angles, M-Shapes, and S-Shapes: ASTM A36/A36M; ASTM A572/A572M, Grade 50 or 55; or ASTM A529/A529M, Grade 50 or 55.
 3. Plate and Bar: ASTM A36/A36M; ASTM A572/A572M, Grade 50 or 55; or ASTM A529/A529M, Grade 50 or 55.
 4. Steel Pipe: ASTM A53/A53M, Type E or S, Grade B.
 5. Cold-Formed Hollow Structural Sections: ASTM A500, Grade B or C, structural tubing.
 6. Structural-Steel Sheet: Hot-rolled, ASTM A1011/A1011M, Structural Steel (SS), Grades 30 through 55, or High-Strength Low-Alloy Steel (HSLAS) or High-Strength Low-Alloy Steel with Improved Formability (HSLAS-F), Grades 45 through 70; or cold-rolled, ASTM A1008/A1008M, Structural Steel (SS), Grades 25 through 80, or HSLAS, Grades 45 through 70.
 7. Metallic-Coated Steel Sheet: ASTM A653/A653M, SS, Grades 33 through 80, or HSLAS or HSLAS-F, Grades 50 through 80; with G60 coating designation; mill phosphatized.
 8. Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A755/A755M.

- a. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, SS, Grades 33 through 80, or HSLAS or HSLAS-F, Grades 50 through 80; with G90 coating designation.
 - b. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A792/A792M, SS, Grade 50 or 80; with Class AZ50 coating.
9. Joist Girders: Manufactured according to "Standard Specifications for Joist Girders," in SJI's "Standard Specifications and Load Tables for Steel Joists and Joist Girders"; with steel-angle, top- and bottom-chord members, and end- and top-chord arrangements as indicated on Drawings and required for primary framing.
 10. Steel Joists: Manufactured according to "Standard Specifications for Open Web Steel Joists, K-Series," in SJI's "Standard Specifications and Load Tables for Steel Joists and Joist Girders"; with steel-angle, top- and bottom-chord members, and end- and top-chord arrangements as indicated on Drawings and required for secondary framing.
 11. Non-High-Strength Bolts, Nuts, and Washers: ASTM A307, Grade A, carbon-steel, hex-head bolts; ASTM A563 carbon-steel hex nuts; and ASTM F844 plain (flat) steel washers.
 - a. Finish: Hot-dip zinc coating, ASTM F2329, Class C.
 12. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.
 - a. Finish: Hot-dip zinc coating, ASTM F2329, Class C.
 13. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A490, Type 1, heavy-hex steel structural bolts or Grade F2280 tension-control, bolt-nut-washer assemblies with splined ends; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.
 14. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F3125/F3125M, Grade F1852, Type 1, heavy-hex or round head assemblies consisting of steel structural bolts with splined ends; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1 hardened carbon-steel washers.
 - a. Finish: Mechanically deposited zinc coating, ASTM B695, Class 50
 15. Unheaded Anchor Rods: Manufacturer's standard as required to meet requirements.
 16. Headed Anchor Rods: Manufacturer's standard as required to meet requirements.
 17. Threaded Rods: Manufacturer's standard as required to meet requirements.
- J. Finish: Factory primed. Apply specified primer immediately after cleaning and pretreating.
1. Clean and prepare in accordance with SSPC-SP2.
 2. Coat with manufacturer's standard primer. Apply primer to primary and secondary framing to a minimum dry film thickness of 1 mil.

- a. Prime secondary framing formed from uncoated steel sheet to a minimum dry film thickness of 0.5 mil on each side.

2.5 METAL ROOF PANELS

A. Standing-Seam, Vertical-Rib, Metal Roof Panels: Formed with vertical ribs at panel edges and flat pan between ribs, unless stiffening is required to meet ; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels and engaging opposite edge of adjacent panels.

1. Material: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.024-inch nominal uncoated steel thickness. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
 - a. Exterior Finish: Two-coat fluoropolymer.
 - b. Color: As selected by Architect from manufacturer's full range.
2. Clips: One-piece fixed or Two-piece floating to accommodate thermal movement.
3. Joint Type: Panels snapped together or Mechanically seamed.
4. Panel Coverage: 16 inches.
5. Panel Height: Manufacturer's standard, but not less than 1 ½ inches.

B. Finishes:

1. Exposed Coil-Coated Finish:
 - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

2.6 METAL WALL PANELS

A. Exposed-Fastener, Tapered-Rib, Metal Wall Panels: Formed with raised, trapezoidal major ribs and flat pan between major ribs, unless stiffeners are required; designed to be installed by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps.

1. Material: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet 0.024-inch nominal uncoated steel thickness. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
 - a. Exterior Finish: Two-coat fluoropolymer.

- b. Color: As selected by Architect from manufacturer's full range.
 - 2. Major-Rib Spacing: 12 inches o.c.
 - 3. Panel Coverage: 36 inches.
 - 4. Panel Height: Manufacturer's standard, but not less than 0.75 inch.
- B. Finishes:
- 1. Exposed Coil-Coated Finish:
 - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

2.7 METAL SOFFIT PANELS

- A. General: Provide factory-formed metal soffit panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners and factory-applied sealant in side laps. Include accessories required for weathertight installation.
- B. Metal Soffit Panels: Match profile and material of metal wall panels.
 - 1. Finish: Match finish and color of metal wall panels.

2.8 THERMAL INSULATION

- A. Faced Metal Building Insulation: Manufacturer's standard system, meeting ASTM C991, Type II, glass-fiber-blanket insulation; 0.5-lb/cu. ft. density; 2-inch-wide, continuous, vapor-tight edge tabs; with a flame-spread index of 25 or less.
- B. Mineral-Fiber-Blanket Insulation: ASTM C665, type indicated below; consisting of fibers manufactured from glass, slag wool, or rock wool.
 - 1. Nonreflective Faced: Type II (blankets with nonreflective membrane covering), Category I (membrane is a vapor retarder), Class A (membrane-faced surface with a flame-spread index of 25 or less).
 - 2. Reflective Faced: Type III (blankets with reflective membrane covering), Category I (membrane is a vapor retarder), Class A (membrane-faced surface with a flame-spread index of 25 or less).
 - 3. Unfaced: Type I (blankets without membrane covering), passing ASTM E136 for combustion characteristics.

- C. Retainer Strips: For securing insulation between supports, 0.025-inch nominal-thickness, formed, metallic-coated steel or PVC retainer clips colored to match insulation facing.
- D. Vapor-Retarder Facing: ASTM C1136, with permeance not greater than 0.02 perm when tested according to ASTM E96/E96M, Desiccant Method. Provide one of the following:
 - 1. Composition: White metallized-polypropylene film facing, fiberglass scrim reinforcement, and kraft-paper backing.
 - 2. Composition: White polypropylene or vinyl film facing, fiberglass scrim reinforcement, and metallized-polyester film backing.
 - 3. Composition: White polypropylene film facing and fiberglass-polyester-blend fabric backing.
- E. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

2.9 PERSONNEL DOORS, FRAMES and HARDWARE

- A. Swinging Personnel Doors and Frames: As specified in Section 081113 "Hollow Metal Doors and Frames" and hardware as specified in Section 087100 "Hardware".

2.10 WINDOWS

- A. Aluminum Windows: Metal building system manufacturer's standard, with self-flashing mounting fins, and as follows:
 - 1. Type, Performance Class, and Performance Grade: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 and as follows:
 - a. Outswing Awnings and casement Windows.
 - 2. Aluminum Extrusions: ASTM B221, alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish, but not less than 0.064-inch thickness at any location for main frame and sash members.
 - a. Thermally Improved Construction: Fabricate window units with an integral, concealed, low-conductance thermal barrier; located between exterior materials and window members exposed on interior side; in a manner that eliminates direct metal-to-metal contact.
 - 3. Fasteners, Anchors, and Clips: Nonmagnetic stainless steel, aluminum, or other noncorrosive material, compatible with aluminum window members, trim, hardware, anchors, and other components of window units. Fasteners shall not be exposed, except for attaching hardware.
 - a. Reinforcement: Where fasteners screw-anchor into aluminum less than 0.128 inch thick, reinforce interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard, noncorrosive, pressed-in, spline grommet nuts.

4. Hardware: Manufacturer's standard; of aluminum, stainless steel, die-cast steel, malleable iron, or bronze; including the following:
 - a. Cam-action sweep sash lock and keeper at meeting rails.
 - b. Spring-loaded, snap-type lock at jambs.
 - c. Pole-operated, cam-action locking device on meeting rail where rail is more than 72 inches above floor.
 - d. Lift handles for single-hung units.
 - e. Nylon sash rollers for horizontal-sliding units.
 - f. Steel or bronze operating arms.
5. Insect Screens: Provide removable insect screen on each operable exterior sash, with screen frame finished to match window unit, and as follows:
 - a. Fabric: Manufacturer's standard aluminum wire fabric or glass-fiber mesh fabric.

B. Glazing:

1. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of 2.5-mm-thick clear float glass separated by a dehydrated interspace, qualified according to ASTM E2190.
2. Safety Glass at All Windows: Category II materials complying with testing requirements in 16 CFR 1201.
 - a. Provide safety glazing labeling.
3. Glazing Stops: Screw-applied or snap-on glazing stops coordinated with Section 088000 "Glazing" and with glazing system indicated. Match material and finish of window frames.
4. Factory-Glazed Fabrication: Glaze window units in the factory to greatest extent possible and practical for applications indicated. Comply with requirements in Section 088000 "Glazing."

C. Finish:

1. Baked-Enamel Finish, Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603 except with a minimum dry film thickness of 0.7 mil, medium gloss.
 - a. Color: As selected by Architect from manufacturer's full range.

2.11 ACCESSORIES

- A. General: Provide accessories as standard with metal building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.

1. Form exposed sheet metal accessories that are without excessive oil-canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
- B. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, ridge closures, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.
1. Closures: Provide closures at eaves and ridges, fabricated of same material as metal roof panels.
 2. Clips: Manufacturer's standard, formed from steel sheet, designed to withstand negative-load requirements.
 3. Cleats: Manufacturer's standard, mechanically seamed cleats formed from steel sheet.
 4. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 5. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
 6. Thermal Spacer Blocks: Where metal panels attach directly to purlins, provide thermal spacer blocks of thickness required to provide 1-inch standoff; fabricated from extruded polystyrene.
- C. Rail-Type, Seam-Mounted Snow Guards:
1. Description: Snow guard rails fabricated from metal pipes, bars, or extrusions, anchored to brackets and equipped with minimum two rails.
 2. Brackets and Baseplate: ASTM A240, Type 304 stainless steel; mill.
 3. Bars: ASTM A240, Type 304 stainless steel; mill finish.
 - a. Profile: Round.
 4. Seam clamps: ASTM B221 aluminum extrusion or ASTM B85/B85M aluminum casting with stainless steel set screws incorporating round nonpenetrating point; designed for use with applicable roofing system to which clamp is attached. Ensure isolation of steel and aluminum.
- D. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including copings, fasciae, mullions, sills, corner units, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels unless otherwise indicated.
1. Closures: Provide closures at eaves and rakes, fabricated of same material as metal wall panels.
 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or

premolded to match metal wall panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

- E. Flashing and Trim: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inch nominal uncoated steel thickness, prepainted with coil coating; finished to match adjacent metal panels.
1. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers.
 2. Opening Trim: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inch nominal uncoated steel thickness, prepainted with coil coating. Trim head and jamb of door openings, and head, jamb, and sill of other openings.
- F. Gutters: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inch nominal uncoated steel thickness, prepainted with coil coating; finished to match roof fascia and rake trim. Match profile of gable trim, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch-long sections, sized according to SMACNA's "Architectural Sheet Metal Manual."
1. Gutter Supports: Fabricated from same material and finish as gutters.
 2. Strainers: Bronze, copper, or aluminum wire ball type at outlets.
- G. Downspouts: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inch nominal uncoated steel thickness, prepainted with coil coating; finished to match metal wall panels. Fabricate in minimum 10-foot-long sections, complete with formed elbows and offsets.
1. Mounting Straps: Fabricated from same material and finish as gutters.
- H. Mezzanine Framing: Cold-formed metal framing. Refer to Section 054000 "Cold-Formed Metal Framing", or manufacturer's standard steel mezzanine.
1. Delegated Design: Engage a qualified professional engineer, licensed in the State of Connecticut, to design mezzanine framing and deck system in its entirety. Submit signed and sealed documents for Permit approval as part of the Shop Drawing Submission. Design shall incorporate all related systems and assemblies to ensure compatibility and coordination throughout the structure.
- I. Louvers: Size and design indicated; self-framing and self-flashing. Fabricate welded frames from zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.048-inch nominal uncoated steel thickness; finished to match metal wall panels. Form blades from zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.036-inch nominal uncoated steel thickness; folded or beaded at edges, set at an angle that excludes driving rains, and secured to frames by riveting or welding. Fabricate louvers with equal blade spacing to produce uniform appearance.
1. Blades: Fixed, drainable.
 2. Free Area: Not less than 8.0 sq. ft. for 48-inch-wide by 48-inch-high louver.

3. Bird Screening: Galvanized steel, 1/2-inch-square mesh, 0.041-inch wire; with rewirable frames, removable and secured with clips; fabricated of same kind and form of metal and with same finish as louvers.
 - a. Mounting: Interior face of louvers.

- J. Roof Curbs: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.048-inch nominal uncoated steel thickness prepainted with coil coating; finished to match metal roof panels; with welded top box and bottom skirt, and integral full-length cricket; capable of withstanding loads of size and height indicated.
 1. Curb Subframing: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.060-inch nominal uncoated steel thickness, angle-, C-, or Z-shaped metallic-coated steel sheet.
 2. Insulation: 1-inch-thick, rigid type.

- K. Pipe Flashing: Premolded, EPDM pipe collar with flexible aluminum ring bonded to base.

- L. Materials:
 1. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide fasteners with heads matching color of materials being fastened by means of plastic caps or factory-applied coating.
 - a. Fasteners for Metal Roof Panels: Self-drilling or self-tapping, zinc-plated, hex-head carbon-steel screws, with a stainless-steel cap or zinc-aluminum-alloy head and EPDM sealing washer.
 - b. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws with hex washer head.
 - c. Blind Fasteners: High-strength aluminum or stainless-steel rivets.
 2. Corrosion-Resistant Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
 3. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.
 4. Metal Panel Sealants:
 - a. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene-compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape of manufacturer's standard size.
 - b. Joint Sealant: ASTM C920; one part elastomeric polyurethane or polysulfide; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended by metal building system manufacturer.

2.12 FABRICATION

- A. General: Design components and field connections required for erection to permit easy assembly.
 - 1. Mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.
 - 2. Fabricate structural framing to produce clean, smooth cuts and bends. Punch holes of proper size, shape, and location. Members shall be free of cracks, tears, and ruptures.
- B. Tolerances: Comply with MBMA's "Metal Building Systems Manual" for fabrication and erection tolerances.
- C. Primary Framing: Shop fabricate framing components to indicated size and section, with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.
 - 1. Make shop connections by welding or by using high-strength bolts.
 - 2. Join flanges to webs of built-up members by a continuous, submerged arc-welding process.
 - 3. Brace compression flange of primary framing with steel angles or cold-formed structural tubing between frame web and purlin web or girt web, so flange compressive strength is within allowable limits for any combination of loadings.
 - 4. Weld clips to frames for attaching secondary framing if applicable, or punch for bolts.
 - 5. Shop Priming: Prepare surfaces for shop priming according to SSPC-SP 2. Shop prime primary framing with specified primer after fabrication.
- D. Secondary Framing: Shop fabricate framing components to indicated size and section by roll forming or break forming, with baseplates, bearing plates, stiffeners, and other plates required for erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.
 - 1. Make shop connections by welding or by using non-high-strength bolts.
 - 2. Shop Priming: Prepare uncoated surfaces for shop priming according to SSPC-SP 2. Shop prime uncoated secondary framing with specified primer after fabrication.
- E. Metal Panels: Fabricate and finish metal panels at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.
 - 1. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of metal panel.

2.13 SOURCE QUALITY CONTROL

- A. Special Inspection: Owner will engage a qualified special inspector to perform source quality control inspections and to submit reports.

1. Accredited Manufacturers: Special inspections will not be required if fabrication is performed by an IAS AC472-accredited manufacturer approved by authorities having jurisdiction to perform such Work without special inspection.
 - a. After fabrication, submit copy of certificate of compliance to authorities having jurisdiction, certifying that Work was performed according to Contract requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Before erection proceeds, survey elevations and locations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments to receive structural framing, with erector present, for compliance with requirements and metal building system manufacturer's tolerances.
 1. Engage land surveyor to perform surveying.
- C. Proceed with erection only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition.
- B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural framing, connections, and bracing are in place unless otherwise indicated.

3.3 ERECTION OF STRUCTURAL FRAMING

- A. Erect metal building system according to manufacturer's written instructions and drawings.
- B. Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer.
- C. Set structural framing accurately in locations and to elevations indicated, according to AISC specifications referenced in this Section. Maintain structural stability of frame during erection.
- D. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.
 2. Tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 3. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- E. Align and adjust structural framing before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with framing. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
1. Level and plumb individual members of structure.
 2. Make allowances for difference between temperature at time of erection and mean temperature when structure will be completed and in service.
- F. Primary Framing and End Walls: Erect framing level, plumb, rigid, secure, and true to line. Level baseplates to a true even plane with full bearing to supporting structures, set with double-nutted anchor bolts. Use grout to obtain uniform bearing and to maintain a level base-line elevation. Moist-cure grout for not less than seven days after placement.
1. Make field connections using high-strength bolts installed according to RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt type and joint type specified.
 - a. Joint Type: Snug tightened or pretensioned as required by manufacturer.
- G. Secondary Framing: Erect framing level, plumb, rigid, secure, and true to line. Field bolt secondary framing to clips attached to primary framing.
1. Provide rake or gable purlins with tight-fitting closure channels and fasciae.
 2. Locate and space wall girts to suit openings such as doors and windows.
 3. Provide supplemental framing at entire perimeter of openings, including doors, windows, louvers, ventilators, and other penetrations of roof and walls.
- H. Bracing: Install bracing in roof and sidewalls where indicated on erection drawings.
1. Tighten rod and cable bracing to avoid sag.
 2. Locate interior end-bay bracing only where indicated.
- I. Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to structural framing.
- J. Erection Tolerances: Maintain erection tolerances of structural framing within AISC 303.

3.4 METAL PANEL INSTALLATION, GENERAL

- A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.
- C. Examination: Examine primary and secondary framing to verify that structural-panel support members and anchorages have been installed within alignment tolerances required by manufacturer.
 - 1. Examine roughing-in for components and systems penetrating metal panels, to verify actual locations of penetrations relative to seams before metal panel installation.
- D. General: Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Field cut metal panels as required for doors, windows, and other openings. Cut openings as small as possible, neatly to size required, and without damage to adjacent metal panel finishes.
 - a. Field cutting of metal panels by torch is not permitted unless approved in writing by manufacturer.
 - 2. Install metal panels perpendicular to structural supports unless otherwise indicated.
 - 3. Flash and seal metal panels with weather closures at perimeter of openings and similar elements. Fasten with self-tapping screws.
 - 4. Locate and space fastenings in uniform vertical and horizontal alignment.
 - 5. Locate metal panel splices over structural supports with end laps in alignment.
 - 6. Lap metal flashing over metal panels to allow moisture to run over and off the material.
- E. Lap-Seam Metal Panels: Install screw fasteners using power tools with controlled torque adjusted to compress EPDM washers tightly without damage to washers, screw threads, or metal panels. Install screws in predrilled holes.
 - 1. Arrange and nest side-lap joints so prevailing winds blow over, not into, lapped joints. Lap ribbed or fluted sheets one full rib corrugation. Apply metal panels and associated items for neat and weathertight enclosure. Avoid "panel creep" or application not true to line.
- F. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.

- G. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants indicated; or, if not indicated, provide types recommended by metal panel manufacturer.
 - 1. Seal metal panel end laps with double beads of tape or sealant the full width of panel. Seal side joints where recommended by metal panel manufacturer.
 - 2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

3.5 METAL ROOF PANEL INSTALLATION

- A. General: Provide metal roof panels of full length from eave to ridge unless otherwise indicated or restricted by shipping limitations.
 - 1. Install ridge caps as metal roof panel work proceeds.
 - 2. Flash and seal metal roof panels with weather closures at eaves and rakes. Fasten with self-tapping screws.
- B. Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint, at location and spacing and with fasteners recommended by manufacturer.
 - 1. Install clips to supports with self-drilling or self-tapping fasteners.
 - 2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
 - 3. Snap Joint: Nest standing seams and fasten together by interlocking and completely engaging factory-applied sealant.
 - 4. Seamed Joint: Crimp standing seams with manufacturer-approved motorized seamer tool so that clip, metal roof panel, and factory-applied sealant are completely engaged.
 - 5. Rigidly fasten eave end of metal roof panels and allow ridge end free movement for thermal expansion and contraction. Predrill panels for fasteners.
 - 6. Provide metal closures at peaks, rake edges, rake walls and each side of ridge caps.
- C. Metal Fascia Panels: Align bottom of metal panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws. Flash and seal metal panels with weather closures where fasciae meet soffits, along lower panel edges, and at perimeter of all openings.
- D. Metal Roof Panel Installation Tolerances: Shim and align metal roof panels within installed tolerance of 1/4 inch in 20 feet on slope and location lines and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.6 METAL WALL PANEL INSTALLATION

- A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts, extending full height of building, unless otherwise

indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Unless otherwise indicated, begin metal panel installation at corners with center of rib lined up with line of framing.
 2. Shim or otherwise plumb substrates receiving metal wall panels.
 3. When two rows of metal panels are required, lap panels 4 inches minimum.
 4. When building height requires two rows of metal panels at gable ends, align lap of gable panels over metal wall panels at eave height.
 5. Rigidly fasten base end of metal wall panels and allow eave end free movement for thermal expansion and contraction. Pre-drill panels.
 6. Flash and seal metal wall panels with weather closures at eaves and rakes, and at perimeter of all openings. Fasten with self-tapping screws.
 7. Install screw fasteners in predrilled holes.
 8. Install flashing and trim as metal wall panel work proceeds.
 9. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated on Drawings; if not indicated, as necessary for waterproofing.
 10. Align bottom of metal wall panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws.
 11. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.
- B. Metal Wall Panels: Install metal wall panels on exterior side of girts. Attach metal wall panels to supports with fasteners as recommended by manufacturer.
- C. Installation Tolerances: Shim and align metal wall panels within installed tolerance of 1/4 inch in 20 feet, noncumulative; level, plumb, and on location lines; and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.7 METAL SOFFIT PANEL INSTALLATION

- A. Provide metal soffit panels the full width of soffits. Install panels perpendicular to support framing.
- B. Flash and seal metal soffit panels with weather closures where panels meet walls and at perimeter of all openings.

3.8 THERMAL INSULATION INSTALLATION

- A. General: Install insulation concurrently with metal panel installation, in thickness indicated to cover entire surface, according to manufacturer's written instructions.
 1. Set vapor-retarder-faced units with vapor retarder toward warm side of construction unless otherwise indicated. Do not obstruct ventilation spaces except for firestopping.
 2. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to the surrounding construction to ensure airtight installation.

3. Install factory-laminated, vapor-retarder-faced blankets straight and true in one-piece lengths, with both sets of facing tabs sealed, to provide a complete vapor retarder.
4. Install blankets straight and true in one-piece lengths. Install vapor retarder over insulation, with both sets of facing tabs sealed, to provide a complete vapor retarder.

B. Blanket Roof Insulation: Comply with the following installation method:

1. Over-Framing Installation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing. Hold in place by metal roof panels fastened to secondary framing.
2. Between-Purlin Installation: Extend insulation and vapor retarder between purlins. Carry vapor-retarder-facing tabs up and over purlin, overlapping adjoining facing of next insulation course and maintaining continuity of retarder. Hold in place with bands and crossbands below insulation.
3. Over-Purlin-with-Spacer-Block Installation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing. Install layer of filler insulation over first layer to fill space formed by metal roof panel standoffs. Hold in place by panels fastened to standoffs.
 - a. Thermal Spacer Blocks: Where metal roof panels attach directly to purlins, install thermal spacer blocks.
4. Two-Layers-between-Purlin-with-Spacer-Block Installation: Extend insulation and vapor retarder between purlins. Carry vapor-retarder-facing tabs up and over purlin, overlapping adjoining facing of next insulation course and maintaining continuity of retarder. Install layer of filler insulation over first layer to fill space between purlins formed by thermal spacer blocks. Hold in place with bands and crossbands below insulation.
 - a. Thermal Spacer Blocks: Where metal roof panels attach directly to purlins, install thermal spacer blocks.
5. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.

C. Blanket Wall Insulation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing. Hold in place by metal wall panels fastened to secondary framing.

1. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.
2. Sound-Absorption Insulation: Where sound-absorption requirement is indicated for metal liner panels, cover insulation with polyethylene film and provide inserts of wire mesh to form acoustical spacer grid.

3.9 DOOR AND FRAME INSTALLATION

- A. General: Install doors and frames plumb, rigid, properly aligned, and securely fastened in place according to manufacturers' written instructions. Coordinate installation with wall flashings and

other components. Seal perimeter of each door frame with elastomeric sealant used for metal wall panels.

- B. Personnel Doors and Frames: Install doors and frames according to NAAMM-HMMA 840. Fit non-fire-rated doors accurately in their respective frames, with the following clearances:
 - 1. Between Doors and Frames at Jambs and Head: 1/8 inch.
 - 2. Between Edges of Pairs of Doors: 1/8 inch.
 - 3. At Door Sills with Threshold: 3/8 inch.
 - 4. At Door Sills without Threshold: 3/4 inch.
 - 5. At fire-rated openings, install frames according to, and doors with clearances specified in, NFPA 80.

- C. Door Hardware:
 - 1. Install surface-mounted items after finishes have been completed at heights indicated in DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 3. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
 - 4. Set thresholds for exterior doors in full bed of sealant complying with requirements for concealed mastics specified in Section 079200 "Joint Sealants."

3.10 WINDOW INSTALLATION

- A. General: Install windows plumb, rigid, properly aligned, without warp or rack of frames or sash, and securely fasten in place according to manufacturer's written instructions. Coordinate installation with wall flashings and other components. Seal perimeter of each window frame with elastomeric sealant used for metal wall panels.
 - 1. Separate dissimilar materials from sources of corrosion or electrolytic action at points of contact with other materials by complying with requirements specified in AAMA/WDMA/CSA 101/I.S.2/A440.

- B. Set sill members in bed of sealant or with gaskets, for weathertight construction.

- C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.

- D. Mount screens directly to frames with tapped screw clips.

3.11 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal roof panel assembly, including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
 2. Install components for a complete metal wall panel assembly, including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
 3. Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturer.
- B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
1. Install exposed flashing and trim that is without excessive oil-canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- C. Gutters: Join sections with riveted-and-soldered or lapped-and-sealed joints. Attach gutters to eave with gutter hangers spaced as required for gutter size, but not more than 36 inches o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.
- D. Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.
1. Provide elbows at base of downspouts to direct water away from building.
 2. Tie downspouts to underground drainage system indicated.
- E. Louvers: Locate and place louver units level, plumb, and at indicated alignment with adjacent work.
1. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
 2. Provide perimeter reveals and openings of uniform width for sealants and joint fillers.
 3. Protect galvanized- and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of corrosion-resistant paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.

4. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 079200 "Joint Sealants" for sealants applied during louver installation.

- F. Roof Curbs: Install curbs at locations indicated on Drawings. Install flashing around bases where they meet metal roof panels.
- G. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to panel as recommended by manufacturer.

3.12 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform field quality control special inspections and to submit reports.
- B. Product will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.13 ADJUSTING

- A. Doors: After completing installation, test and adjust doors to operate easily, free of warp, twist, or distortion.
- B. Door Hardware: Adjust and check each operating item of door hardware and each door to ensure proper operation and function of every unit. Replace units that cannot be adjusted to operate as intended.
- C. Windows: Adjust operating sashes and ventilators, screens, hardware, and accessories for a tight fit at contact points and at weather stripping to ensure smooth operation and weathertight closure. Lubricate hardware and moving parts.

3.14 CLEANING AND PROTECTION

- A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.
- B. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- C. Touchup Painting: After erection, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted structural framing, bearing plates, and accessories.
 - 1. Clean and prepare surfaces by SSPC-SP 2, "Hand Tool Cleaning," or by SSPC-SP 3, "Power Tool Cleaning."
 - 2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

- D. Metal Panels: Remove temporary protective coverings and strippable films, if any, as metal panels are installed. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
 - 1. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.
- E. Doors and Frames: Immediately after installation, sand rusted or damaged areas of prime coat until smooth and apply touchup of compatible air-drying primer.
 - 1. Immediately before final inspection, remove protective wrappings from doors and frames.
- F. Windows: Clean metal surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances. Clean factory-glazed glass immediately after installing windows.
- G. Louvers: Clean exposed surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.
 - 1. Restore louvers damaged during installation and construction period so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.
 - a. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 133419

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SECTION 142123 – MACHINE ROOMLESS HOLELESS HYDRAULIC ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies hydraulic elevators.
- B. Work Required:
 - 1. The work required under this section consists of all labor, materials and services required for the complete installation (including operational verification) of all the equipment required for the elevator(s) as herein specified.
 - 2. All work shall be performed in a first class, safe and workmanlike manner.
 - 3. In all cases where a device or part of the equipment is herein referred to in the singular, it is intended that such reference shall apply to as many of such devices or parts as are required to make complete installation.
- C. Related work not specified herein: The following sections contain requirements that relate to this section and are performed by trades other than the elevator manufacturer/installer.
 - 1. Section 00 31 33.11 – Elevator Agreement for General Diagnostic Tool Agreement
 - 2. Section 01 50 00 - Construction Facilities and Temporary Controls: protection of floor openings and personnel barriers; temporary power and lighting.
 - 3. Section 017419 - Construction and Demolition Waste Management and Disposal
 - 4. Section 018113 “Sustainable Design Requirements” for general, administrative, procedural and product requirements for compliance with requirements of the USGBC’s, LEED for BD & C, Version 4.1.
 - 5. Section 018119 “Construction Indoor Air Quality Requirements” for requirements related to construction indoor air quality.
 - 6. Section 03 30 00 - Cast-In-Place Concrete: elevator pit, elevator motor and pump foundation, and grouting thresholds.
 - 7. Section 04 20 00 - Unit Masonry: masonry hoistway enclosure, building-in and grouting hoistway door frames, grouting thresholds.
 - 8. Section 05 50 00 - Metal Fabrications: pit ladder, divider beams, support for entrances and rails, hoisting beam at top of hoistway.
 - 9. Division 26 00 00 - Electrical:
 - a. Main disconnects for each elevator.
 - b. Electrical power for elevator installation and testing.
 - c. Disconnecting device to elevator equipment prior to activation of sprinkler system.
 - d. The installation of dedicated GFCI receptacles in the pit and overhead.
 - e. Lighting in controller area, machine area and pit.
 - f. Wiring for telephone service to controller.

10. Division 26 32 00 - Standby Power Supply Systems: emergency generator for elevator operation.
 11. Division 27 30 00 - Telephone Systems: ADAAG-required emergency communications equipment.
 12. Division 28 46 00 - Fire Alarm Systems: fire and smoke detectors and interconnecting devices; fire alarm signal lines to contacts in the machine area.
 13. Section 505000 "Elevator Agreement"
- D. Applicable Codes: Comply with applicable building and elevator codes at the project site, including but not limited to the following:
1. ANSI A117.1, Buildings and Facilities, Providing Accessibility and Usability for Physically Handicapped People.
 2. ADAAG, Americans with Disabilities Act Accessibility Guidelines.
 3. ANSI/NFPA 70, National Electrical Code.
 4. ANSI/NFPA 80, Fire Doors and Windows.
 5. ASME/ANSI A17.7, Safety Code for Elevators and Escalators.
 6. ANSI/UL 10B, Fire Tests of Door Assemblies.
 7. CAN/CSA C22.1, Canadian Electrical Code.
 8. CAN/CSA-B44, Safety Code for Elevators and Escalators.
 9. EN 12016 (May 1998): "EMC Product Family Standards for lifts, escalators, and passenger conveyors Part 2 – immunity"
 10. Local Building Codes.
 11. All other local applicable codes.

1.2 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the Project's environmental performance goals, which include achieving LEED v4 Certification and demonstrating compliance with the State of Connecticut's High-Performance Building Standards. Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for the Project's target certification level and specific LEED requirements. The Contractor shall ensure that the requirements related to the Project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

1.3 SYSTEM DESCRIPTION

- A. Equipment Description: Holeless Hydraulic elevator with Machine-Room Less application
- B. Equipment Control: Elevonic® Control System. (See basis of Design)
- C. Quantity of Elevators: One (1)

- D. Elevator Stop Designations: Lobby and Lower Level
- E. Stops : 2
- F. Openings: Front opening.
- G. Travel (maximum): 12'-0" Floor to Floor.
- H. Rated Capacity: 2100 lb.
- I. Rated Speed: 100 fpm.
- J. Platform Size: 2100 front & rear - 5'-9 1/2" W x 5'-6 1/8" D
Clear Inside Dimensions: 2100 front & rear - 5'-8 5/16" W x 4'-4 1/8" D
- K. Cab Height: 7'-9"
- L. Clear Cab Height: 7'-9" with 5/16" floor recess and 4 LED ceiling
- M. Entrance Type and Width: Single-Slide Door 3-feet
- N. Entrance Height: 7' 0"
- O. Main Power Supply: 208 - Volts, 3-Phase, 60Hz + or - 5% of normal, three-Phase, with a separate equipment grounding conductor.
- P. Car Lighting Power Supply: 120 Volts, Single-phase, 15 Amp, 60 Hz.
- Q. Machine and Controller Location: No machine-room required, tank and controller in hoistway pit.
- R. Signal Fixtures: Manufacturer's standard with stainless steel metal button targets (exc. CA).
- S. Controller Location: Inside hoistway, accessible by a door in a side hoistway wall on the 1st or 2nd landing. (1st landing only if rear entrance)
- T. Stopping Accuracy: $\pm 1/4"$ (6.4 mm) under any loading condition or direction of travel.
- U. Operation:
Simplex Collective Operation: Using a microprocessor-based controller, operation shall be automatic by means of the car and hall buttons. If all calls in the system have been answered, the car shall park at the last landing served.
- W. Operating Features – Standard

1. Full Collective Operation
2. Anti-nuisance.
3. Fan and Light Protection.
4. Load Weighing Bypass.
5. Independent Service.
6. Full Collective Operation.
7. Firefighters' Service Phase I and Phase II.
8. Top of Car Inspection.

X. Door Control Features:

1. Door control to open doors automatically when car arrives at a landing in response to a normal hall or car call.
2. Elevator doors shall be provided with a reopening device that will stop and reopen the car door(s) and hoistway door(s) automatically should the door(s) become obstructed by an object or person.
Door protection shall consist of a two dimensional, multi-beam array projecting across the car door opening.
3. Door nudging operation to occur if doors are prevented from closing for an adjustable period of time.

Y. Provide equipment according to seismic criteria indicated on the Drawings.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's product data for each system proposed for use. Include the following:

1. Signal and operating fixtures, operating panels and indicators.
2. Cab design, dimensions and layout.
3. Hoistway-door and frame details.
4. Electrical characteristics and connection requirements.
5. Expected heat dissipation of elevator equipment in hoistway (BTU).
6. Color selection chart for Cab and Entrances.

B. Sustainable Design Submittals:

1. LEED v4 Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.

C. Shop Drawings: Submit approval layout drawings. Include the following:

1. Car, guide rails, buffers and other components in hoistway.
2. Maximum rail bracket spacing.
3. Maximum loads imposed on guide rails requiring load transfer to building structure.
4. Clearances and travel of car.
5. Clear inside hoistway and pit dimensions.
6. Location and sizes of access doors, hoistway entrances and frames.

- D. Operations and Maintenance Manuals: Provide manufacturer's standard operations and maintenance manual.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Elevator manufacturer shall be ISO 9001 certified.
- B. Installer: Elevators shall be installed by the manufacturer.
- C. Permits, Inspections and Certificates: The Elevator Contractor shall obtain and pay for necessary Municipal or State Inspection and permit as required by the elevator inspection authority, and make such tests as are called for by the regulations or such authorities. These tests shall be made in the presence of such authorities or their authorized representatives.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Should the building or the site not be prepared to receive the elevator equipment at the agreed upon date, the General Contractor will be responsible to provide a proper and suitable storage area on or off the premises.

Should the storage area be off-site and the equipment not yet delivered, then the elevator contractor, upon notification from the General Contractor, will divert the elevator equipment to the storage area. If the equipment has already been delivered to the site, then the General Contractor shall transport the elevator equipment to the storage area. The cost of elevator equipment taken to storage by either party, storage, and redeliver to the job site shall not be at the expense of the elevator contractor.

1.7 WARRANTY

- A. The elevator contractor's acceptance is conditional on the understanding that their warranty covers defective material and workmanship. The warranty period shall not extend longer than one (18) months from the date of completion or acceptance thereof by beneficial use, whichever is earlier, of each elevator. The warranty excludes: ordinary wear and tear, improper use, vandalism, abuse, misuse, or neglect or any other causes beyond the control of the elevator contractor and this express warranty is in lieu of all other warranties, express or implied, including any warranty of merchantability or fitness for a particular purpose.

1.8 MAINTENANCE and SERVICE

- A. Maintenance service consisting of regular examinations and adjustments of the elevator equipment shall be provided by the elevator contractor for a period of six (6) months after the elevator has been turned over for the customer's use. This service shall not be subcontracted but shall be performed by the elevator contractor. All work shall be performed by competent employees during regular working hours of regular working days. This service shall not cover adjustments, repairs or replacement of parts due to negligence, misuse, abuse or accidents caused by persons other than the elevator contractor. Only genuine parts and supplies as used in the manufacture and installation of the original equipment shall be provided.
- B. The elevator control system must:
- 1) Provide in the controller the necessary devices to run the elevator on inspection operation.
 - 2) Provide on top of the car the necessary devices to run the elevator in inspection operation.
 - 3) Provide in the controller an emergency stop switch. This emergency stop switch when opened disconnects power from the brake and prevents the motor from running.
- C. Provide system capabilities to enable a remote expert to create a live, interactive connection with the elevator system to enable the following functions:
1. Remotely diagnose elevator issues with a remote team of experts
 2. Remotely return an elevator to service
 3. Provide real-time status updates via email
 4. Remotely make changes to selected elevator functions including:
 - a. Control building traffic: Restrict floor access, remove car from group operation, shut down elevator, select up peak / down peak mode, activate independent service
 - b. Conserve energy: Activate cab light energy save mode, activate fan energy save mode, shut down car(s)
 - c. Improve passenger experience: Extend door open times, change parking floor, activate auto car full, activate anti-nuisance, advance door opening, door nudging, extend specific floor extended opening time, release trapped passengers

PART 2 - PRODUCTS

2.1 LEED PERFORMANCE REQUIREMENTS

- B. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's LEED performance criteria as outlined in PART 2-PRODUCTS of Section 018113 – Sustainable Design Requirements.

2.2 MANUFACTURERS

- C. Basis-of-Design Product: Subject to compliance with requirements, provide Otis Elevator Co; HydroFit 2100 or a comparable product by one of the following:
1. KONE Inc.
 2. Schindler Elevator Corp.
 3. ThyssenKrupp Elevator.
- D. Source Limitations: Obtain elevator and components from single manufacturer.
1. Major elevator components, including driving machines, controllers, signal fixtures, door operators, car frames, cars, and entrances, shall be manufactured by single manufacturer.

2.3 DESIGN AND SPECIFICATIONS

- A. Provide machine-roomless holeless hydraulic elevators from Otis Elevator Company. The control system and car design based on materials and systems manufactured by Otis Elevator Company. Specifically, the system shall consist of the following components:
1. The entire hydraulic system and the controller shall be located inside the hoistway. No extra machine room or control closet space is required.
 2. Sleep mode operation for LED ceiling lights and car fan.
 3. LED lighting standard in ceiling lights and elevator fixtures.
 4. Sleep mode operation for LED ceiling lights and car fan.
- B. Approved Installer: Otis Elevator
- C. Subject to compliance with requirements, other manufacturers include:
1. Kone, Inc.
 2. Schindler Elevator Corporation
 3. Thyssenkrupp Elevator Corporation

2.2 EQUIPMENT: MACHINE COMPONENTS

- A. The hydraulic system shall be of compact design suitable for operation under the required pressure. The power component shall be mounted in the hydraulic-fluid storage tank. The control valve shall control flow for up and down directions hydraulically and shall include an integral check valve. A control section including control solenoids shall direct the main valve and control: up and down starting, acceleration, transition from full speed to leveling speed, up and down stops, pressure relief and manual lowering. All of these functions shall be fully adjustable for maximum smoothness and to meet contract conditions. System to be provided with a low-pressure switch and a shut-off valve.

The entire hydraulic system with hydraulic-fluid storage tank, power component and valves shall be located in the hoistway pit and be easily accessible for maintenance through an access door in the hoistway wall.

- B. A microprocessor-based controller shall be provided, including necessary starting switches together with all relays, switches, solid-state components and hardware required for operation, including door operation, as described herein. A three (3) phase overload device shall be provided to protect the motor against overloading.
The controller shall be located together with the hydraulic system in the hoistway pit and be easily accessible for maintenance through the same access door that is also used for the hydraulic system.
- C. A manual lowering feature shall permit lowering the elevator at slow speed in the event of power failure or for adjusting purposes.
- D. Pressure Switch
- E. General Diagnostic Device.

2.3 EQUIPMENT: HOISTWAY COMPONENTS

- A. Plunger(s) and Cylinder(s): Each cylinder shall be constructed of steel pipe of sufficient thickness and suitable for the operating pressure. The top of each cylinder shall be equipped with a cylinder head with a drip ring to collect any oil seepage as well as an internal guide ring and self-adjusting packing. Each plunger shall be constructed of selected steel tubing or pipe of proper diameter machined true and smooth with a fine polished finish. Each plunger shall be provided with a stop ring electrically welded to it to prevent the plunger from leaving the cylinder. Each plunger and cylinder shall be installed plumb and shall operate freely with minimum friction.
- B. Car Guide Rails: Tee-section steel rails with brackets and fasteners.
- C. Polyurethane type buffers shall be used.
- D. Wiring: Wiring for hoistway electrical devices included in scope of the elevator system, hall panels, pit emergency stop switch, pit light and the traveling cable for the elevator car.
- E. Hoistway Entrances:
 - 1. Frames: Entrance frames shall be of bolted construction for complete one-piece unit assembly. All frames shall be securely fastened to fixing angles mounted in the hoistway and shall be of UL fire rated steel.
 - 2. Sills shall be extruded aluminum or bronze finish, or nickel silver finish.
 - 3. Doors: Entrance doors shall be of metal construction with vertical channel reinforcements.

4. Fire Rating: Entrance and doors shall be UL fire rated for 1-1/2 hour (for M1, M2, M3, D1, and D2 Entrance Arrangements or 1 hour for D3 Entrance Arrangement.
5. Entrance marking plates: Entrance jambs shall be marked with 4" x 4" plates having raised floor markings with Braille located adjacent to the floor marking. Marking plates shall be provided on both sides of the entrance.
6. Sight Guards: sight guards will be furnished with all doors painted to match with painted doors, painted black for stainless steel and gold satin doors.

2.4 EQUIPMENT: CAR COMPONENTS

A. Cab

1. Cab Options: Steel Shell Cab with stainless steel vertical removable panels
2. Car Front Finish: Satin Stainless Steel.
3. Car Door Finish: Satin Stainless Steel
4. Ceiling Type: Flat steel ceiling Brushed Steel Finish (BSF) with 4 LED lights.
5. Emergency Car Lighting: An emergency power unit employing a 6-volt sealed rechargeable battery and totally static circuits shall be provided to illuminate the elevator car in the event of building power failure.
6. Fan: A one-speed 120 VAC fan will be mounted to the structural ceiling to facilitate in-car air circulation, meeting A17.1 code requirements. The fan shall be rubber mounted to prevent the transmission of structural vibration and will include a baffle to diffuse audible noise. A switch shall be provided in the car-operating panel to control the fan.
7. Handrail: Handrails shall be provided on the side and rear walls of the car enclosure. Handrails shall be 3/8" x 2" flat tubular handrail with a Brushed Steel Finish.
8. Threshold: Extruded Aluminum.
9. Emergency Exit Contact: An electrical contact shall be provided on the car-top exit.
10. Guides: Car roller type guides at the top and the bottom.
11. Platform: Car platform shall be constructed of metal.
12. Certificate frame: Provide a Certificate frame with a satin stainless steel finish.
13. The LED ceiling lights and the fan should automatically shut off when the system is not in use and be powered back up after a passenger calls the elevator and pushes a hall button.

14. 120V receptacle and light located on the top of the car and associated wiring.

2.5 EQUIPMENT: SIGNAL DEVICES AND FIXTURES

- A. Car Operating Panel: A car operating panel shall be provided which contains all push buttons, key switches, and message indicators for elevator operation. The car operating panel shall have a satin stainless-steel finish.

A car operating panel shall be furnished. It shall contain a bank of round stainless steel, mechanical LED illuminated buttons. Flush mounted to the panel and marked to correspond to the landings served. All buttons to have raised numerals and Braille markings with:

Flat Flush Mounted satin stainless steel button with blue or white LED illuminating halo

The car operating panel shall be equipped with the following features:

1. Raised markings and Braille to the left hand side of each push-button.
2. Car Position Indicator at the top of and integral to the car operating panel.
Door open and door close buttons.
Inspection key-switch.
Elevator Data Plate marked with elevator capacity and car number.
3. Help Button: The help button shall initiate two-way communication between the car and a location inside the building, switching over to another location if the call is unanswered, where personnel are available who can take the appropriate action.
Visual indicators are provided for call initiation and call acknowledgement.
4. Landing Passing Signal: A chime bell shall sound in the car to signal that the car is either stopping at or passing a floor served by the elevator.
5. Firefighter's hat
6. Firefighter's Phase II Key-switch

- B. Car Position Indicator: A digital, LED car position indicator shall be integral to the car operating panel.

- C. Hall Fixtures: Hall fixtures shall be provided with necessary push buttons and key switches for elevator operation.

Integral Hall fixtures shall feature round stainless steel, mechanical buttons marked to correspond to the landings. Hall fixtures to be located in the entrance frame face or the wall. Buttons shall be in vertically mounted fixture. Fixture shall be satin stainless steel.

Button shall be Flat Flush Mounted satin stainless-steel button with blue or white LED illuminating halo.

- D. Car Lantern and Chime: A directional lantern visible from the corridor shall be provided in the car entrance. When the car stops and the doors are opening, the lantern shall indicate the direction in which the car is to travel, and a chime will sound.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Take field dimensions and examine conditions of substrates, supports, and other conditions under which this work is to be performed. Do not proceed with work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Installation of all elevator components shall be the responsibility of the Contractor. Coordinate Work provided by elevator manufacturer and installer with Work required for a complete installation.

3.3 DEMONSTRATION

- A. The elevator contractor shall make a final check of each elevator operation with the Owner or Owner's representative present prior to turning each elevator over for use. The elevator contractor shall determine that control systems and operating devices are functioning properly.

3.4 ELEVATOR AGREEMENT

- A. The General Contractor shall be responsible for completing and executing the Elevator Agreement, included in Section 505000 "Elevator Agreement" and submitting fully executed copy of Elevator Agreement to the Owner prior to Substantial Completion.

END OF SECTION 142123

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